MUSKOX

Life History and Current Status of Muskoxen in the NWT.

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Life History and Current Status of Muskoxen in the NWT.

D. R. Urquhart

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Northwest Territories Renewable Resources
Wildlife Service

Note to the Reader
Every year new information is received about muskox numbers and distribution in the Northwest Territories. For recent developments and the most up-to-date information, contact the N.W.T. Wildlife Service in Yellowknife.

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TABLE OF CONTENTS

Introduction 1

Life History
- Taxonomy 3
- Description 3
- Distribution and Numbers 3
- Reproduction 5
- Mortality 5
- Population Dynamics and Densities 5
- Habitat 6
- Behaviour 6
- Economic Importance 6

Status 9

Zone 1 11
- Axel Heiberg Island 11
- North Ellesmere Island 11
- Prince Patrick Island 12
- Melville Island 12
- Byam Martin and Eglinton Islands 12

Zone 2 15
- Bathurst Island Group 15
- Cornwallis and Little Cornwallis Islands 15
- Devon Island 16
- South Ellesmere Island 17

Zone 3 19
- Banks Island 19

Zone 4 21
- Victoria Island 21

Zone 5 23
- Prince of Wales Island 23
- Somerset Island 24
- Boothia Peninsula 24
- King William Island 24

Zone 6 27
- Baffin Island Group 27
- Southampton Island Group 27

Zone 7 29
- Queen Maud Gulf 29
- Thelon Game Sanctuary 29
- Thelon East 30
- Central Mainland 30
- Great Bear North 31

Zone 8 33
- Chesterfield Inlet North 33
- Melville Peninsula 33
- Chesterfield Inlet South 33

Personal Communications 34

Literature Cited 35

List of Figures

Figure 1. Distribution of muskoxen in the N.W.T. 2

Figure 2. Muskox zones in the N.W.T. assigned in this report for ease of discussion. ... 8

Figure 3. Muskox management areas in the N.W.T. 9

Figure 4. Zone 1, showing muskox areas on western and Northern Queen Elizabeth Islands, and the north half of Ellesmere Island, based on sightings from surveys 1961-77. 10

Figure 5. Zone 2, showing muskox areas on southeastern Queen Elizabeth Islands, and the south half of Ellesmere Island, based on sightings from surveys 1973-80 14

Figure 6. Zone 3, showing muskox areas on Banks Island, based on sightings from surveys 1979-80. 18

Figure 7. Zone 4, showing muskox areas on Victoria Island, based on sightings from surveys 1974-82. 20

Figure 8. Zone 5, showing muskox areas on Prince of Wales and Somerset Islands, based on sightings from surveys 1974-80. 22

Figure 9. Zone 6, showing a single muskox sighting on Baffin Island in 1968. 26

Figure 10. Zone 7, showing muskox areas on the mainland, based on sightings from surveys 1974-80 28

Figure 11. Zone 8, showing two muskox sightings in the Keewatin in 1976 and 1977. 32

List of Tables

Table 1. Distribution and abundance of muskoxen in the N.W.T. 4

Table 2. Muskox harvest quotas for N.W.T. communities as of October, 1982. 7

INTRODUCTION

The Northwest Territories supports most of the world's muskox (Ovibos moschatus) *population. Once a circumpolar species, the muskox is now confined to Canada, Alaska, Greenland and Norway. It has recently been reintroduced to the U.S.S.R. This large herbivore, which inhabits one of the most inclement regions of arctic Canada, remains a source of wonder and respect to those who contemplate the hardships over which it triumphs.*

For centuries and possibly millenia, muskoxen and men have pursued a relationship which, in recent times at least, has proven beneficial to both. Long an almost ignored species, the muskox is at last recovering from intensive hunting in the 19th century. It may again with proper management become a principal source of food and revenue for people in the N.W.T.

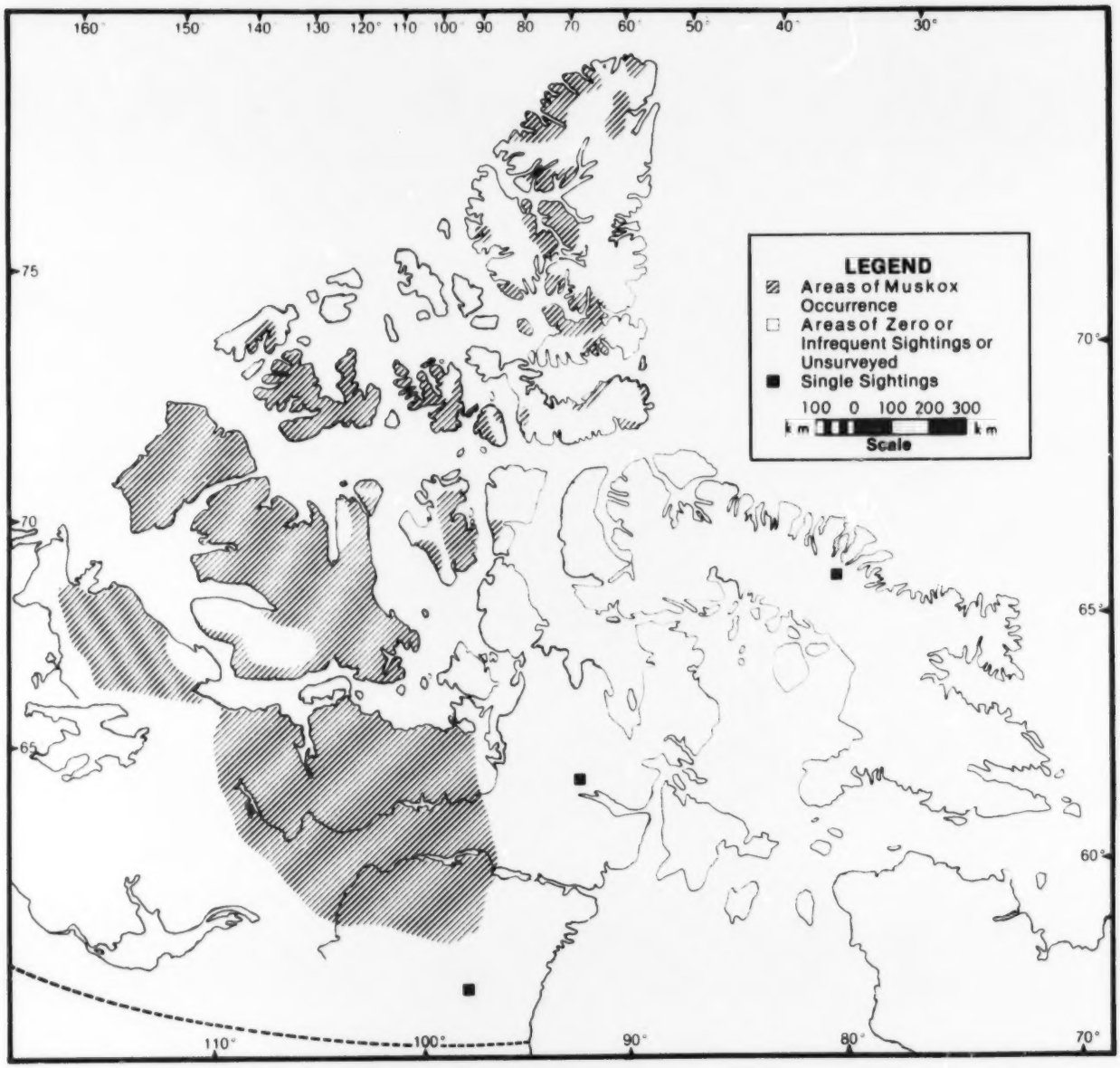


Figure 1. Distribution of muskoxen in the N.W.T.

LIFE HISTORY

Taxonomy

The generic name *Ovibos* (*ovis* - sheep, *bos* - cow) indicates the uncertainty with which the muskox was originally classified. Superficially it resembles cattle-like animals such as the bison, but also has traits associated with sheep and goats. Recent serological tests indicate that this animal is most closely aligned with goats. Consequently it is classified as a separate tribe *Ovibosini* in the subfamily *Caprinae* of the family *Bovidae* (Tener 1965).

Based on a number of slight physical differences, two subspecies are currently recognized in Canada. They are *Ovibos moschatus wardi* on the arctic archipelago, and *Ovibos moschatus moschatus* on the N.W.T. mainland (Tener 1965). Subspeciation is believed to have occurred during the Wisconsin glaciation. During that period, *O. m. wardi* became isolated in northern glacial refugia, whereas *O. m. moschatus* retreated southward from the advancing ice sheet (Tener 1965).

The only surviving relative of the muskox is the takin (*Budorca* sp.) which inhabits Tibet, Burma and China (Tener 1965).

Description

The most distinctive features of the muskox are its long coarse coat, shoulder hump and large curving horns. In mature males, the horns meet above the forehead in a massive boss. Both sexes have dark brown bodies with pale muzzles, saddles, legs and stockings.

Bulls are approximately 135 cm (4.5 ft) tall at the shoulder, 225 cm (7.5 ft) in length and weigh about 340 kg (750 lbs) (Tener 1965). Cows are smaller and weigh considerably less.

The general configuration and thick coat of muskoxen present a lumbering appearance, yet these animals are swift and agile in open terrain as well as adept climbers on snow or rock.

Distribution and Numbers

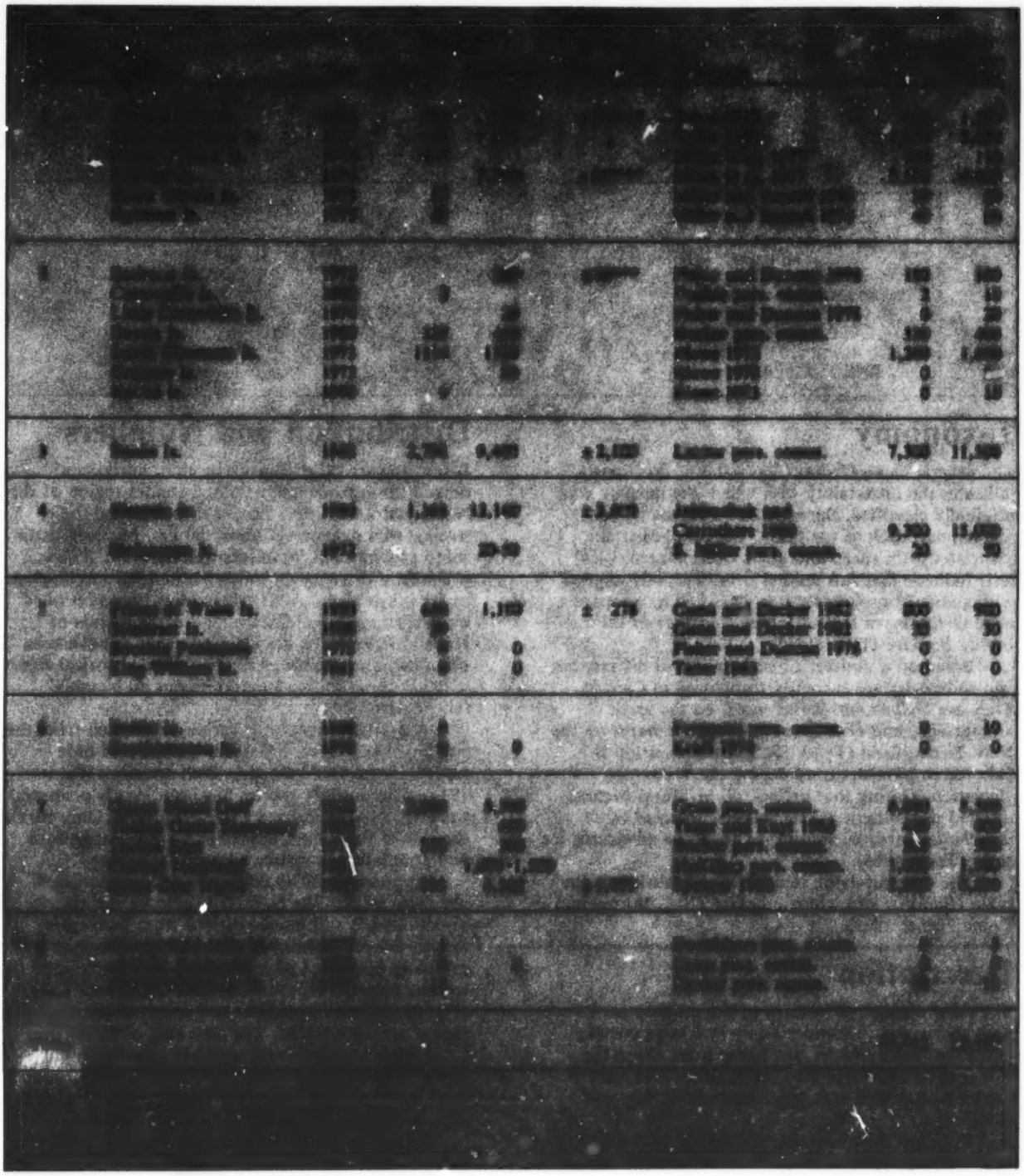
Before the arrival of European man, muskoxen ranged throughout the mainland tundra region of the Northwest Territories. They also penetrated the treeline to a distance of about 80 km, reaching as far south as Churchill, Manitoba (Hone 1934). Their prehistoric presence on much of the arctic archipelago as far north as the Alert plateau has been presumed or confirmed. Southampton and other islands of Hudson Bay, which are believed never to have been occupied, are notable exceptions. The historical status of muskox on Baffin Island remains ambiguous (Harington 1976).

A drastic reduction in numbers resulted from the combined efforts of expedition parties and hide traders in the 19th and early 20th centuries (Hone 1934). The muskox species has been legally protected since 1917 but its recovery has been slow. Only within the last 15 years have appreciable range expansions and population increases become apparent.

Approximately 45,000 ± 11,100 muskoxen presently inhabit the N.W.T. (Table 1), but their distribution is still much reduced from its former extent. On the mainland, the southern extremity presently lies about 80 km north of and parallel to the treeline between Hudson Bay and Great Bear Lake (Fig. 1). Boothia Peninsula and much of the Keewatin region are unoccupied. The area east of Great Bear Lake remains nearly vacant, while concentrations north of Great Bear Lake and south of Queen Maud Gulf are expanding rapidly (Spencer 1980, Decker pers. comm.).

Muskoxen are broadly distributed across the arctic archipelago with concentrations on Ellesmere Island (Tener 1965, Riewe 1973, Chowns 1976), Mellville Island (Miller et al. 1977), Banks Island (Vincent and Gunn 1981), and Victoria Island (Jakimchuk and Carruthers 1980). Elsewhere, insular populations fluctuate considerably. The species has always been scarce on the north central Queen

Table 1. Distribution and abundance of muskoxen in the N.W.T.



* Zones assigned in this report for ease of discussion.
** Based on author's best estimate of current population levels.
*** Arbitrarily applied by author to make estimate commensurate with others.

Elizabeth Islands (Tener 1965, Miller et al. 1977), and absent from Southampton Island plus the other islands of Hudson Bay. Muskoxen are apparently extinct on King William Island and occur infrequently on Somerset Island (Russell et al. 1978).

Reproduction

Muskoxen mate in August and early September, with calves being born approximately eight months later, between late March and early June (Tener 1965). Specific calving areas may be selected but cows about to bear young remain with the herd (Jingfors 1980).

Reproductive performance is influenced by nutrition. In areas where nutrition is poor, cows conceive in alternate years. Their age of first reproduction is seldom less than four years and often older (Tener 1965, Gray 1973). Where the nutrition is high, cows may conceive as two-year-olds and bear young annually (Urquhart 1973, Kistchinski 1976).

A muskox in captivity delivered twin female calves that were still-born (Wilkinson 1971a). The incidence of twinning in the wild is unknown.

Mortality

Muskox populations are periodically reduced by climatic conditions, particularly those which limit forage accessibility. Such conditions include dense or crusted snow, excessive snow depths, and ground-fast ice (Parker et al. 1975).

Wolf predation is a major cause of mortality especially for calves, yearlings and solitary muskoxen (Hone 1934, Parker et al. 1975). Deaths may result as well from rutting fights between males (Wilkinson and Shank 1976). Parasites and disease are apparently not significant factors in survival except, perhaps, when muskox populations reach very high densities.

Physiological stress, injury and calf abandonment are potential contributors to muskox mortality occasioned by herds fleeing from human disturbances such as aircraft.

Little is known about the longevity of this species in the wild. One animal from Bathurst Island was aged at 19 years (Parker et al. 1975).

Population Dynamics and Densities

The rate at which muskox populations could grow was until recently considered to be very slow. However, it is now known that under optimal conditions, numbers can increase rapidly (Gunn 1982).

Over a 12 year period, the muskox population of Banks Island increased at an average rate of at least 10% (Urquhart 1973). In the succeeding 10 years it increased at a rate of about 20 - 25% (Vincent and Gunn 1981). Muskoxen on Nunivak Island increased steadily in numbers for 21 years at an annual rate of 16% (Lent 1971). Populations in the Canadian arctic mainland are also increasing rapidly.

The most influential regulating factors of muskox populations are density-independent, i.e. climate and habitat availability. Large parts of the Canadian tundra are devoid of suitable forage and could never support this species.

Certain high arctic populations are periodically reduced by severe climatic conditions which may eliminate entire calf crops as well as older individuals (Parker et al. 1975). For example, the muskox population of Bathurst Island declined by 70% between 1973 and 1975. A 30% die-off was recorded for Melville Island for 1973-74 (Miller et al. 1977).

Both calf production and survivorship seem to be influenced by climatic conditions. Calf crops have varied from 0% to 32% depending upon climate and locale (Gray 1973, Urquhart 1973).

Although calf survival has never been studied directly, existing estimates range from 0% to 78% among populations. Such variations appear to be strongly influenced by climate (Parker et al. 1975, Hubert 1977). Recruitments ranging from 0% to 18.8% have been recorded. In 'stable' periods, the rate averages near 10 - 12% (Tener 1965, Parker et al. 1975).

Density-dependent factors such as competition for forage may exist, but rarely operate, as densities are usually suppressed by recurring climatic events. However, this sort of mechanism may be responsible for emigrations manifested in range extensions and inter-island movements. Of the other biotic factors which could be involved, only wolf predation is considered significant.

Habitat

Essential components of muskox habitat are difficult to characterize beyond the requirements for sufficient forage. This factor appears to be the major influence on range selection.

Vegetation in the arctic is most abundant on low coastal plains, lake margins and along watercourses. These areas are preferred by muskoxen which feed in wet meadows dominated by sedges and willows (Russell et al. 1978). Their diet consists of sedges and willows in summer and principally sedges in winter. Snow conditions may, however, force a shift to higher, relatively snow-free areas where only willows, grasses and herbs are available (Tener 1965, Parker and Ross 1976, Parker 1978, Russell et al. 1978).

Regional variations in diet reflect differences in plant communities and snow cover. Mainland diets include a greater proportion of woody plants than do those of the arctic islands (Tener 1965). A potential for limited competition with caribou exists where both species must utilize the same moderately moist habitat because of snow restrictions or excessive numbers of muskoxen (Wilkinson and Shank 1974).

Muskoxen appear to survive equally well in rugged or level country. They do not seem to require particular topographical features for protection from the elements or for seasonal activities such as rutting and calving.

Habitat specifics are poorly understood. In particular, the ability of this species to cope with alterations in its habitat (e.g. roads, pipelines, mines) has not been determined. In Canada, the best habitats below 200 m elevation can support 1 - 2 muskoxen/sq. km on a year-round basis, without severe winters (Thomas et al. 1981).

Behaviour

Like most ungulates, the muskox is a herd animal. The number in a herd varies from two to about 100, but the average size is between eight and 25 animals (Tener 1965, Vincent 1979, Jakimchuk and Carruthers 1980). Herds are relatively unstable in composition. Individuals and groups may mix, split off or join other herds (Gray 1979).

Usually a herd is led by a dominant bull which prevents other bulls from courting cows and is most active in defense against predators. The rut may be associated with violent clashes between contesting males, but generally there is little aggressive interaction. This is exemplified by the free joining of herds, each with its own dominant bull (Gray 1979).

Most often muskoxen react to external threats by forming a defense ring facing the source of disturbance (Tener 1965). This behaviour is quite effective against wolf attacks but not against hunting and harassment by humans. Depending on the stimulus, the defense formation may be abandoned as the herd takes flight with cows and immature animals in the lead and bulls following. Young calves may be left behind; where humans and machinery are involved, the abandoned calves have sometimes adopted the instigators of the retreat (Urquhart 1973).

The reactions of muskoxen to some industrial activities have been investigated. Some short term effects of temporary disturbances seem encouragingly small (Slaney and Co. 1975, Russell 1977, Miller and Gunn 1980). However, there is no information about the long term effects of permanent or periodic disturbances, which may be of greater importance.

Muskoxen have occasionally been sighted on the sea ice in the arctic archipelago, presumably moving from one island to another (Miller et al. 1977).

Economic Importance

At different periods in various regions of the Northwest Territories aboriginal groups appear to have survived for a time exclusively on muskoxen, which were used for food, clothing, shelter and tools (Rasmussen 1932, Hone 1934, Hickey and Steele 1978).

Later, European exploration parties relied heavily upon muskoxen for provisioning. The Hudson's Bay Company traded actively in hides for more than 50 years (Hone 1934). Between 1862 and 1916 a total of 15,101 hides were acquired by that enterprise alone (Tener 1954). Scientific and private expeditions profited from the sale of captured calves and adult specimens. Similar enterprises were undertaken by zoological parks (Hone 1934).

The exploitation of muskoxen waned only with the progressive extermination of the species (Hone 1934). Commercial transactions ceased in Canada when muskoxen became fully protected in 1917 (Hone 1934, Tener 1965). Hunting was prohibited at that time, but a few animals continued to be used for subsistence in remote areas.

The suspension of muskox exploitation lasted for 52 years until hunting, limited by a quota system, was initiated on Ellesmere Island in 1969. Since then, an increasing number of muskoxen have been allotted each year to many arctic communities. Some communities reserve part of their quota for sport hunting. As of October 1982, the total N.W.T. muskox quota was 2289 animals; of that 2000 were allocated to Sachs Harbour in management area B/1-1, with the remainder distributed among 11 settlements throughout the N.W.T. (Table 2).

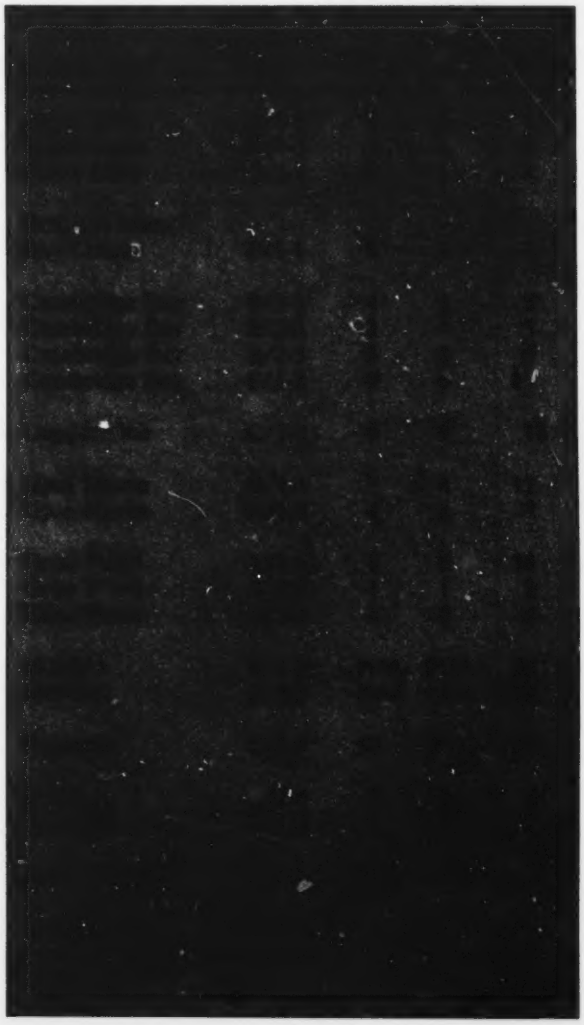
Muskox meat is used primarily for subsistence, although in the past a limited amount has been sold commercially (e.g. the country food store in Frobisher Bay), or traded between settlements. In 1981, however, the Inuvialuit Development Corporation (I.D.C.) in Inuvik began a test marketing programme for muskox meat, under the name "polar beef". Various cuts are packaged and sold in a small store in Inuvik operated by the I.D.C. All muskox meat retailed there comes from the large Sachs Harbour quota.

Muskox by-products are also used to a varying extent. Hides may be sold locally, shipped south for sale, or retained for use as sleeping robes. Heads with capes may be sold or displayed as trophies. Horns are sometimes carved and sold privately or taken to local craft shops.

Experiments with muskox domestication began in Vermont in 1954 (Wilkinson 1971 b). A domesticated herd has also been maintained since 1964 by the University of Alaska, principally for the production of wool (*qiviut*) (Wilkinson 1971b). In 1981, the herd, numbering 115 animals, produced about 295 kg of *qiviut* with an unprocessed value of about $50,000 (Jingfors pers. comm.). The domestication of this species has never been attempted in the N.W.T.

By far the greatest commercial value of the muskox in Canada is as a trophy animal. Sport hunting began in 1979 and could become a major source of income for many arctic settlements. The estimated gross revenue from 60 sport hunts in two western arctic settlements for 1981 was over $400,000. The muskox is also recognized as a valuable asset in the promotion of tourist lodges and wilderness expeditions.

Table 2. Muskox harvest quotas for N.W.T. communities as of October 1982.



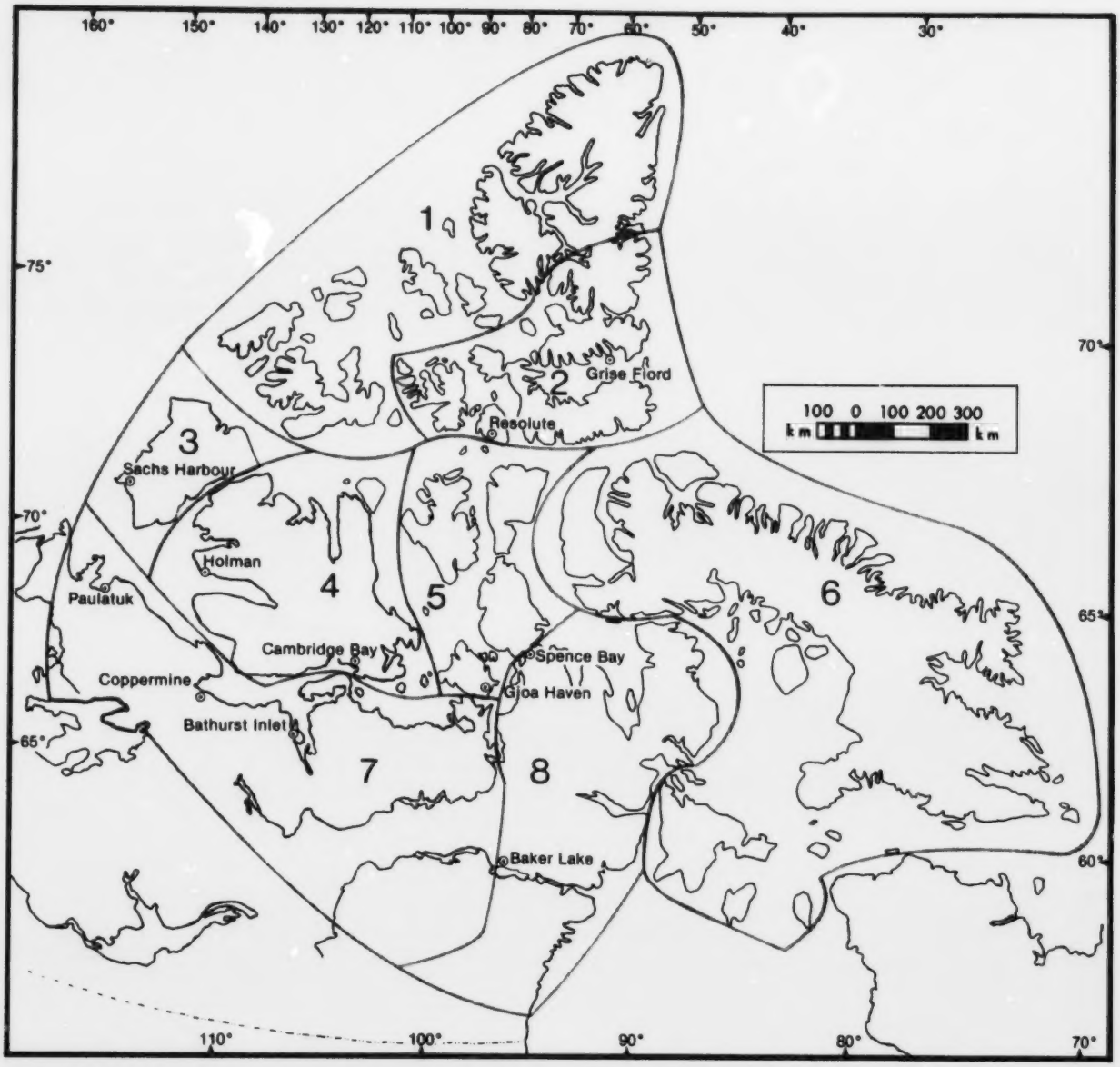


Figure 2. Muskox zones in the N.W.T. assigned in this report for ease of discussion.

STATUS

The distribution of muskoxen in the Northwest Territories has been zoned for convenience in this presentation (Fig. 2). The zones have no legal status. *They merely encompass areas with similar characteristics, namely: geographical location, natural barriers, climate, baseline information, muskox population densities and utilization.*

Within each zone presumed subpopulations are identified and described separately, although some exchange may occur between them. Similarly, zones do not represent isolated populations, since some boundaries no doubt separate interbreeding units.

A total of eight zones has been described.

Note: Muskox management areas, as defined by the N.W.T. Wildlife Regulations, are shown in Figure 3. The allocation of quotas (Table 2) refers to these areas.

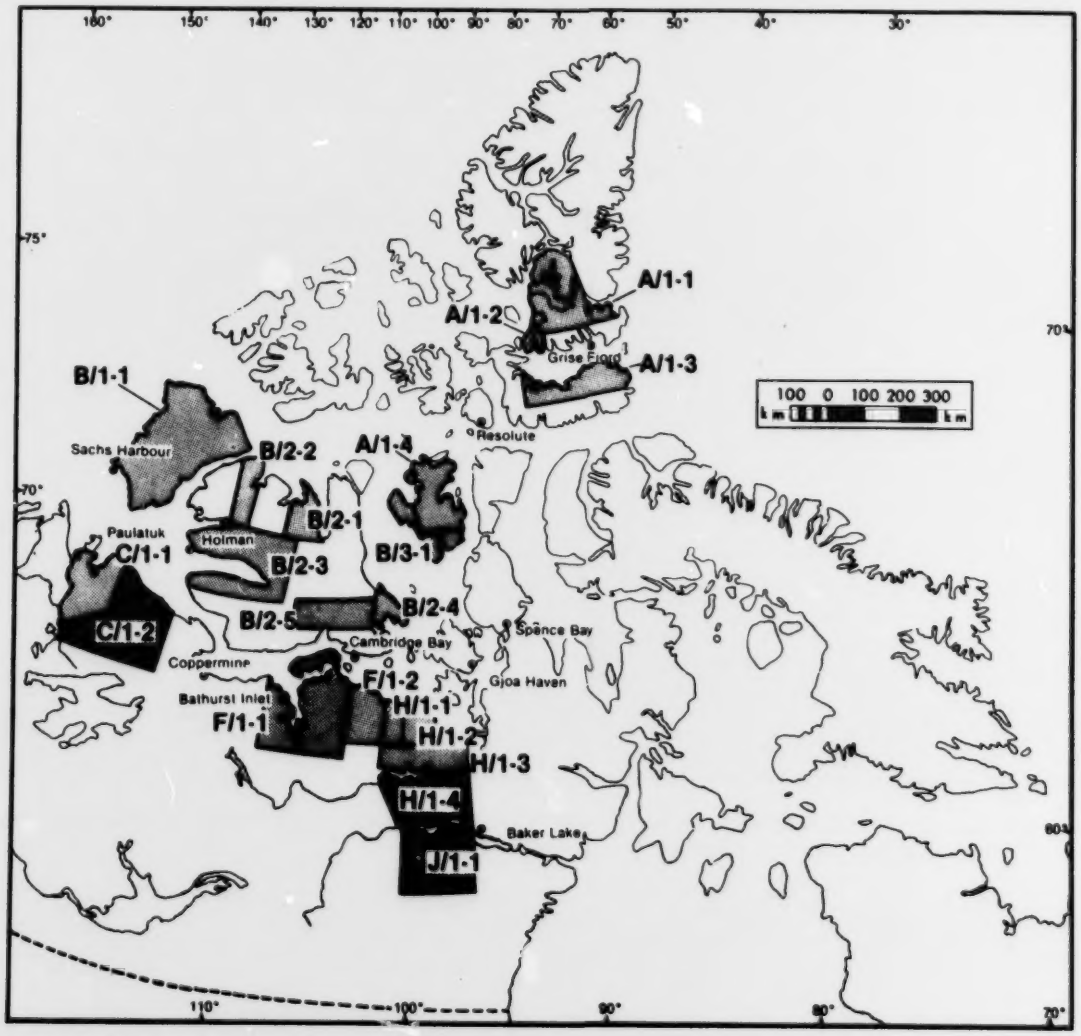


Figure 3. Muskox management areas in the N.W.T.

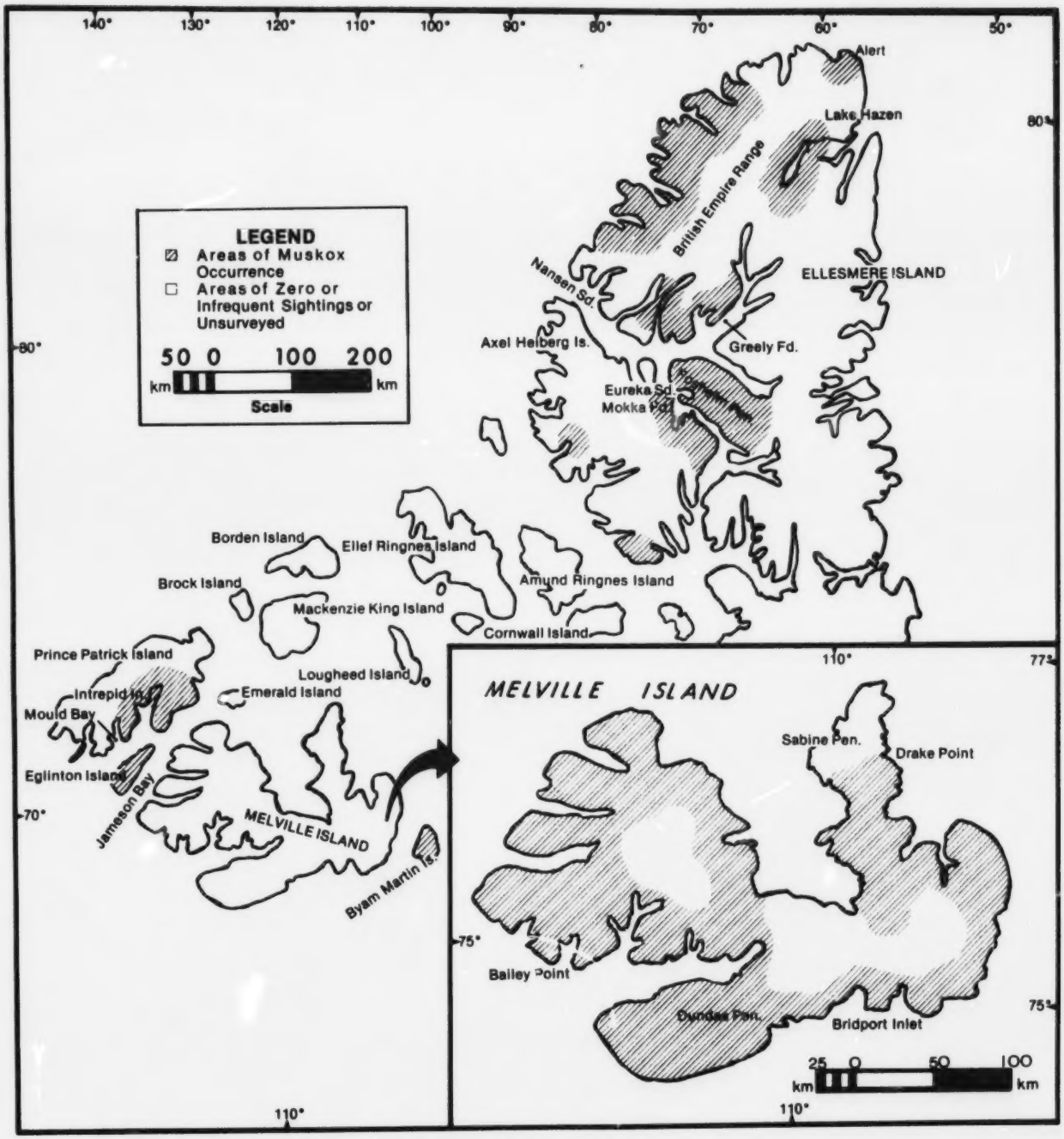


Figure 4. Zone 1, showing muskox areas on western and northern Queen Elizabeth Islands, and the north half of Ellesmere Island, based on sightings from surveys 1961-77.

ZONE 1

This portion of the arctic archipelago (Fig. 4) constitutes a zone where muskoxen are not presently utilized, and where there is little chance of future demand, owing to the zone's relative isolation from arctic communities.

Of the smaller islands in the zone, MacKenzie King, Ellef Ringnes and Amund Ringnes appear to support very small populations intermitently. This is mainly because of poor soil characteristics which limit vegetative growth. Reports for Lougheed, Brock, Emerald, Borden and Cornwall Islands contain no record of the species (Miller et al. 1977). The three major islands plus Byam Martin Island, Eglinton Island and the north half of Ellesmere Island are treated individually below.

Axel Heiberg Island

Population Status

Muskoxen seemed to be numerous on Axel Heiberg Island from 1909 to 1915 and in 1926 (Hone 1934). In 1930 a total of 1,000 animals was subjectively assigned to the island (Anderson 1930).

The population of the entire island has not been considered since 1961 when a conservative figure of 1000 animals was inferred from an aerial survey covering 3% of ice free land (Tener 1963). The calf crop and recruitment at that time were both 7% of 118 animals segregated (Tener 1963).

A range study at Mokka Fiord in 1973 calculated the density of muskoxen in that area at 68/100 sq. km (Parker and Ross 1976). This suggests a substantial population for the island; however, it is not known how well this species withstood the severe climatic conditions of 1973-74.

Although documentation is lacking, this population probably has close affinities with North Ellesmere muskoxen through movements across Nansen and Eureka Sounds.

Industrial Activity

An exploratory oil well was drilled near Mokka Fiord and scheduled for completion in May 1980. Other geological exploration was carried out on parts of the island in 1981. Generally, however, this island receives little exploration attention.

North Ellesmere Island

Population Status

Muskoxen are widely distributed throughout ice-free parts of the island (Tener 1965). Concentrations have been described for Fosheim Peninsula and the Lake Hazen - Alert plateau (Tener 1965). Isolated herds have also been reported along the north shore of Greely Fiord and the coastline north of the British Empire Range (Decker 1976).

A tentative estimate for the entire island in 1961, based on the observation of 605 animals, was 4000. About 25% were believed to occupy the north half (Tener 1963).

Opinions of those familiar with the area are that a present figure of 1000-3000 for the north half of Ellesmere Island is reasonable (Hubert pers. comm.). A calf count of 30% and yearling recruitment of 7.1% were obtained for muskoxen on Fosheim Peninsula in May 1961 (Tener 1963).

Industrial Activity

Meteorological stations are located at Eureka on Fosheim Peninsula and Alert at the northern extremity of the Alert plateau. A number of geological surveys were completed in 1981, and more are planned for 1982 and 1983.

Prince Patrick Island

Population Status

Muskoxen have never been numerous on this island. A survey in the south-east portion recorded 149 animals in 1948 (Macpherson 1961). It was concluded that the species did not exist on the island in 1954, the total die-off being attributed to deep crusted snow conditions in the winter of 1953-54 (Tener 1965). Only three animals were seen there in 1958 (Tener 1965). In 1961 it was concluded that muskoxen did not inhabit the island (Tener 1963).

In 1974, the most recent surveys counted 81 and 105 animals in July and April, respectively. This was considered to be near the island's total population at those times (Miller et al. 1977). Distribution is restricted to the coastal areas of Mould Bay, Intrepid Inlet and Jameson Bay (Miller et al. 1977). The island appears to undergo cycles of extermination and recolonization from Melville and Eglinton Islands.

Industrial Activity

During the peak of oil exploration in the mid 1970s a number of seismic surveys and related geophysical studies were conducted on the island. The immediate future holds similar prospects.

Melville Island

Population Status

From ground observations, a population of 4000 muskoxen was estimated for this island in 1930 (Anderson 1930). The total population was estimated at 1000 in 1961, but subsequent analyses consider this to be a gross underestimate; a figure of 4000 may have been more accurate (Miller et al. 1977).

The population declined from 3394 in 1972 to 2390 in 1974, primarily because of severe snow storms in September and November in 1973, which created hard dense drifts (Miller et al. 1977). A survey of the eastern third of the island in 1977 indicated a 150% increase since 1974 (McLaren et al. 1977). It seems possible that the population may be increasing elsewhere as well. The current population is probably between 2500 and 4500 animals.

Bailey Point is considered to be a refugium for this species in the western Queen Elizabeth Islands. In the early 1970s, densities there ranged from 97 to 201 muskoxen/100 sq. km on the lower half of the island (Thomas et al. 1981). Calf crops for the period 1972-74 varied from 0% to 26% among different regions of the island. Overall figures for each year generally reflect the degree of severity of the previous winters (Miller et al. 1977).

Muskoxen on this island prefer low ground within 5 km of the coast. Seasonal use of ranges may be characterized as a coastal preference in winter with some movement inland to areas of newly exposed vegetation as the snow melts (Miller et al. 1977).

Regular exchanges occur between high density areas on the island. There are also occasional emigrations to nearby Eglinton, Prince Patrick and Byam Martin Islands and possibly farther afield to Banks, Victoria, and Bathurst Islands.

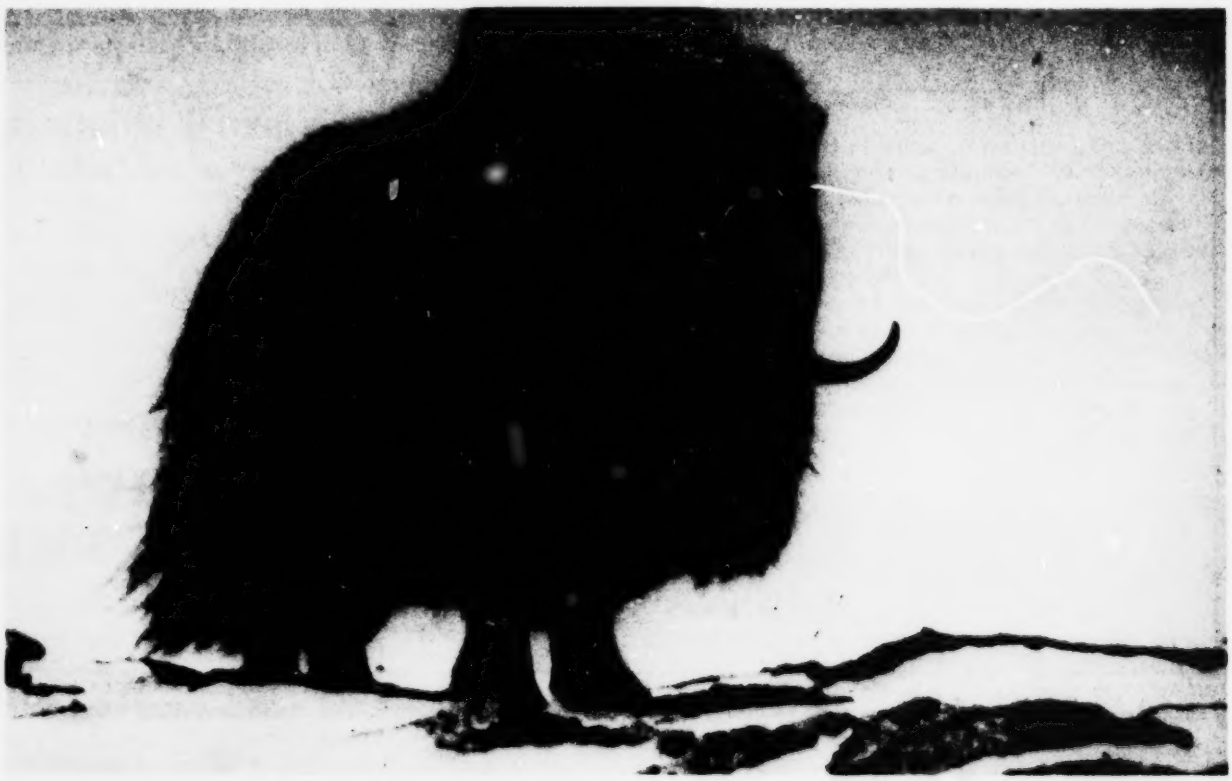
Industrial Activity

The island has been subjected to numerous seismic exploration and well drilling programmes since the early 1960s. Natural gas deposits have been discovered on Sabine Peninsula, and a test well is planned there for 1982. A natural gas pipeline from Drake Point to a liquefaction plant at Bridport Inlet has been proposed by a consortium led by Petro-Canada.

Byam Martin and Eglinton Islands

Population Status

Both of these islands seem to suport small muskox populations. Those of Byam Martin are believed to be permanent residents whereas the Eglinton population may be more transient, shifting periodically to and from Melville Island (Miller and Russell 1974). In 1973, total counts of 55 and 45 muskoxen were made on Byam Martin and Eglinton Islands, respectively (Miller and Russell 1974).



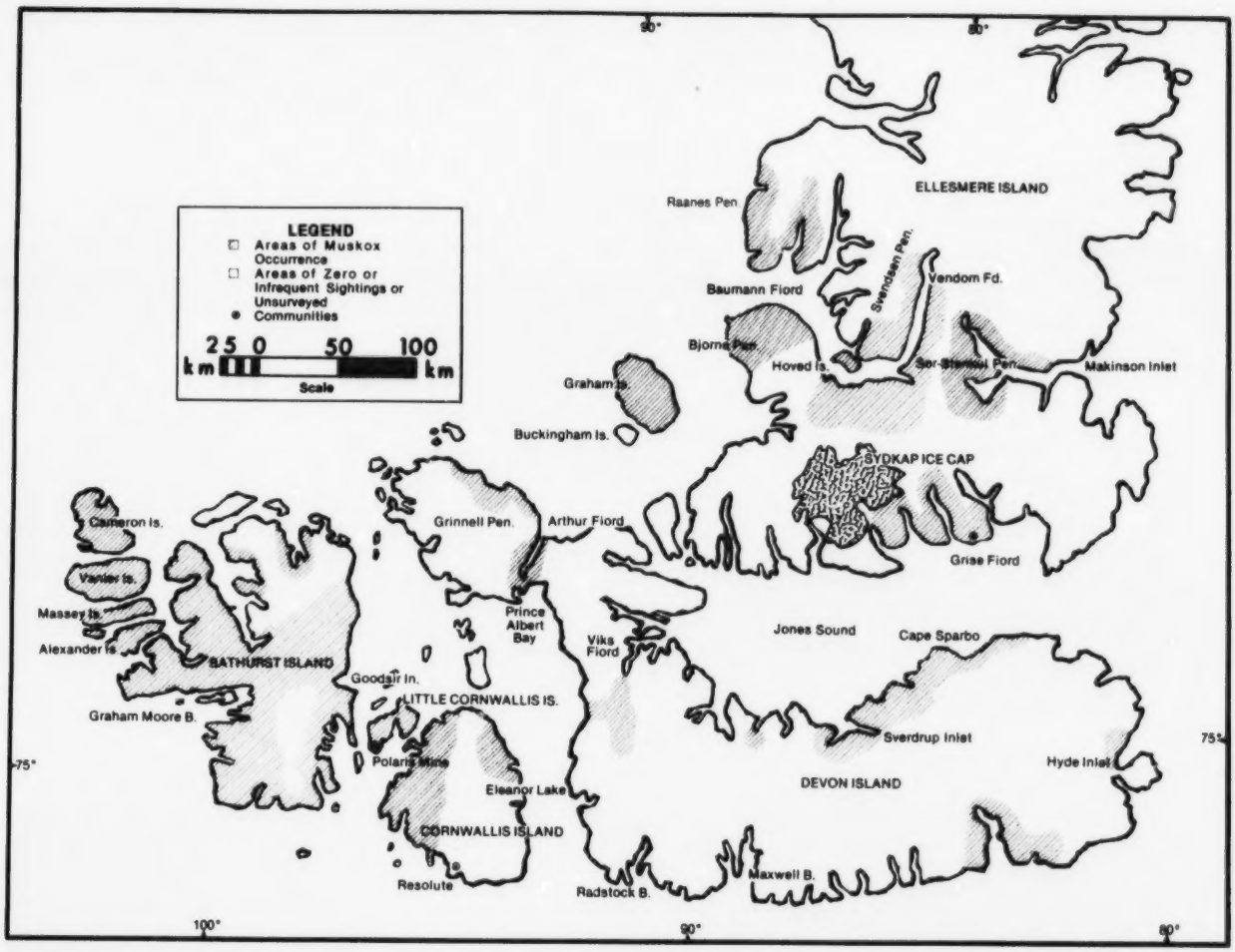


Figure 5. Zone 2, showing muskox areas on southeastern Queen Elizabeth Islands, and the south half of Ellesmere Island, based on sightings from surveys 1973-80.

ZONE 2

The southeastern Queen Elizabeth Islands, including the southern half of Ellesmere, are included in this zone (Fig. 5). Muskoxen in this high arctic region may be hunted by local residents.

Bathurst Island Group

(Including Cameron, Vanier, Massey, and Alexander Islands)

Population Status

The majority of muskoxen on Bathurst Island are sparsely distributed within 8 km of the coast below the 76th parallel (Miller and Russell 1975, Miller et al. 1977). Consistent concentrations exist in the Bracebridge-Goodsir Valley and along the north shore of Graham Moore Bay (Gray 1973, Miller and Russell 1975, Miller et al. 1977). Muskoxen have occasionally been sighted on the smaller islands, and extensive inter-island movements are likely among these smaller islands and Bathurst Island (Miller et al. 1977).

The muskox population of the Bathurst Island group has declined in the past two decades from a total in excess of 1000 to a few hundred in the mid-1970s. In 1961 muskoxen in this area appeared to be unusually productive, with a calf crop of 27.5% and yearling recruitment of 18.8% (Tener 1963). Estimated population reductions of 80% from 1961 to 1974, and 70% from 1973 to 1975, have been attributed to ice formation and excessive snow cover (Miller and Russell 1975, Parker et al. 1975).

A total of 280 muskoxen was calculated from a transect survey in 1975 (Fisher and Duncan 1976). In the absence of more recent data, this figure is considered to be the best available for a current population estimate.

In the mid-1970s calf crops ranged between 10% and zero, and appeared to reflect climatic conditions of previous winters (Miller and Russell 1975). The population may yet be in a precarious state. Although current numbers are unknown, a dramatic increase in the past five years seems unlikely.

Utilization

Muskoxen have not been hunted on Bathurst Island since the enactment of the 1917 protective legislation.

Industrial Activity

The current level of industrial activity in this area is low. It would increase significantly with the approval of a proposed gas pipeline crossing the centre of Bathurst Island from Melville Island to Cornwallis Island. A well was drilled on southwestern Cameron Island in 1981.

Observations of muskoxen in relation to seismic exploration activities in 1974 concluded that such operations may have limited the availability of winter range. However, on only two occasions did encounters with vehicles result in the flight of muskoxen, which could have substantially increased energy demands (Slaney and Co. 1975).

Cornwallis and Little Cornwallis Islands

Population Status

Small numbers of muskoxen may periodically inhabit the west and northwest coasts of Cornwallis Island and the vicinity of Eleanor Lake (Fisher and Duncan 1976). On Little Cornwallis Island, muskoxen have been sighted on the east central coast and along the west coast (Slaney and Co. 1975). Movements between these two islands and Bathurst Island are likely.

Several small herds were sighted on Cornwallis Island between 1950 and 1953, from which a total population of 30 animals was proposed (Macpherson 1959). Transect surveys in 1961 (Tener 1963) and 1974-75 (Fisher and Duncan 1976) were used to infer populations of 40 and 40-50 muskoxen, respectively. A reconnaissance survey of the most prospective habitats in 1980 recorded only two animals; it was felt that few if any more were on the island at that time (Decker pers. comm.).

No muskoxen were observed on a 1961 survey of Little Cornwallis Island (Tener 1965). Total estimates of 40 and 20 were calculated from transect surveys in 1973 (Miller and Russell 1974) and 1974 (Fisher and Duncan 1976), respectively. The current population is unknown, but numbers probably fluctuate between 0 and 20 because of inter-island movements.

Utilization

Muskoxen are not hunted on either island.

Industrial Activity

Recent industrial explorations on Cornwallis Island have been near the settlement of Resolute. The southwest portion of Little Cornwallis Island is the site of the Polaris Mine, which came into production in late 1981.

Devon Island

Population Status

Muskoxen appear to be relatively recent residents of Devon Island, having probably immigrated from Ellesmere Island within the past few hundred years (Harington 1964).

R.C.M.P. reports between 1951 and 1971 indicate that during part of this period, some muskoxen inhabited Grinnell Peninsula (Riewe 1973). They are present, as well, in the vicinity of Arthur Fiord and Prince Albert Bay; along the west coast opposite Viks Fiord; and between Cape Sparbo and Sverdrup Inlet on the northeast coast of the island (Riewe 1973, Hubert 1977). With the exception of a 1961 estimate of 200 for the total island, all estimates prior to 1980 pertain to portions of the north coast excluding Grinnell Peninsula.

Reports of 20 animals and 100 animals were made in 1929 and 1937, respectively (Harington 1964). A ground count of 450 was recorded in 1967 (Freeman 1971), and 275 animals were counted on a small portion of the north coast in 1973 (Jonkel 1973). At both times, the populations were believed to be increasing.

Severe climatic conditions which reduced muskoxen numbers on the adjacent Parry Islands in the winter of 1973-74 may have extended to Devon Island; however, a die-off there was never reported.

A reconnaissance survey of the Devon Island coast and lowlands in 1980 counted a total of 325 muskoxen with a concentration occurring between Cape Sparbo and Sverdrup Inlet; the total population, including areas not covered in 1980, could be nearer 400 animals (Decker pers. comm.).

Utilization

Muskoxen are hunted on the north coast by residents of Grise Fiord. Of the three hunting areas available to these people, this is the most accessible and harvest efforts are concentrated there (see also south Ellesmere Island). A quota for Resolute in the same part of the island is never used.

Industrial Activity

No industrial exploration programmes are planned for this island in the near future and none have taken place there in the recent past. A proposed gas pipeline route crosses the Grinnell Peninsula from Cornwall Island to Cornwallis Island.

South Ellesmere Island

(Including Graham Island, Buckingham Island and Hoved Island)

Population Status

The distribution of muskoxen on the south half of Ellesmere Island is restricted by glacier systems and high barren plateaus in the east, and by Sydkap Ice Cap in the south.

Concentrations were noted on Raanes Peninsula, at the head of Baumann Fiord and east of Vendom Fiord in 1961 (Tener 1963). Raanes Peninsula was again mentioned as an area of relatively high density in 1973, along with Bjorne Peninsula, the south half of Svendsen Peninsula, and Sor-Stenkul Peninsula (Riewe 1973). The most recent survey in 1976 confirmed the importance of the Sor-Stenkul area. It indicated that muskoxen were not abundant in the Vendom Fiord or Svendsen Peninsula areas (Chowns 1976). Elsewhere, muskoxen are confined to narrow valley floors in the vicinity of Makinson Inlet and along the south and west coasts (Chowns 1976).

Only a general indication of total numbers can be interpreted from previous surveys. Approximately 1300 muskoxen can be assigned to 70% of ice-free south Ellesmere Island from a survey which included that area in 1961 (Tener 1963). A 1973 estimate of 1120 was calculated for a slightly larger area (Riewe 1973). Barring a catastrophic decline since 1973, this probably constitutes the most accurate account of muskox numbers for this region.

The calf crop for July 1973 was 16.2% (Riewe 1973), while for September 1976 it was 9.1% (Chowns 1976). An average of 12.5% has been suggested for this area from earlier data (Freeman 1971).

Muskoxen have also been observed on nearby Graham Island. It was estimated that there were 50 animals there in 1967 (Freeman 1971) and 20 in 1973 (Riewe 1973). Nine muskoxen were counted on Hoved Island in 1973, while none were seen on Buckingham Island (Riewe 1973). Tracks between Graham Island and Ellesmere Island and also across Jones Sound indicate that inter-island movements between Graham, Ellesmere and Devon Island do occur (Freeman 1971).

Utilization

Muskoxen are hunted in two zones on Ellesmere Island by residents of Grise Fiord. The quota is seldom filled owing to the inaccessibility of the hunting areas. Hides and heads are often shipped or taken to Resolute for sale to toursits. Some horns are carved and sold privately or to the local Co-op. Meat is used primarily for subsistence, but some is sold in Frobisher Bay.

Industrial Activity

Seismic surveys have been conducted in this area, and in 1981 geological surveys were completed with more planned for 1982. With the transition to offshore exploration for fossil fuels, it is unlikely that the adjacent lands will be exposed to much industrial activity in the future.

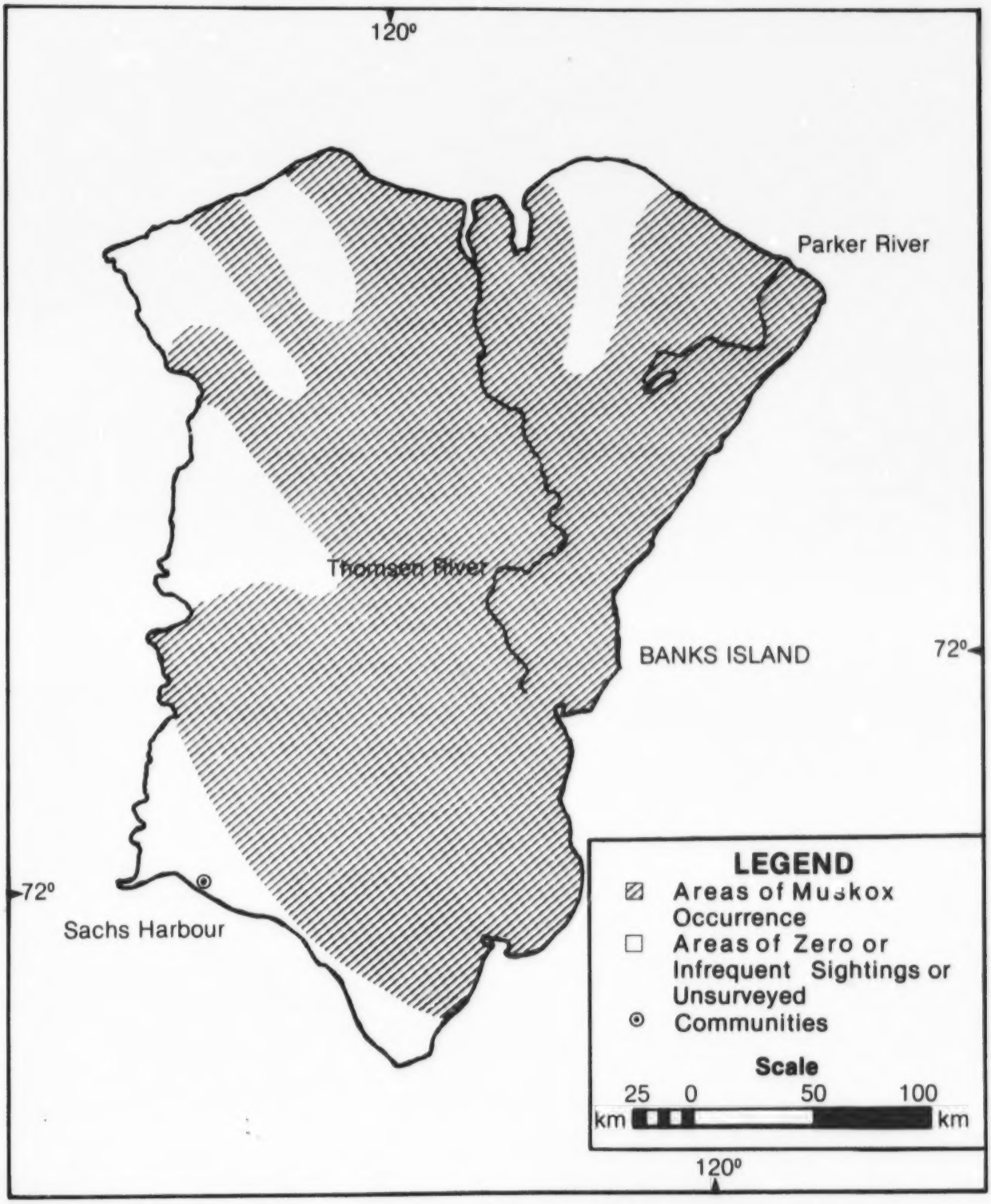


Figure 6. Zone 3, showing muskox areas on Banks Island, based on sightings from surveys 1979-80.

ZONE 3

A separate zone has been provided for Banks Island (Fig. 6) because of the management attention it has received in the past, the significance of this area to the status of muskoxen in Canada, and the large fluctuations in population density which occur here.

Banks Island

Population Status

Muskoxen were presumed to be relatively abundant on Banks Island prior to 1850, but were reduced to near extinction during the next 40 years (Stefansson 1921, Hone 1934).

Reports from 1911 to 1963 suggest that few muskoxen inhabited the island during that period (Harington 1963). A reconnaissance survey of some major drainages in the northern part of the island recorded 800 animals in 1967 (Williams 1967). A systematic survey of the northern half of the island in 1970 produced an estimate of 1200-1800 muskoxen for that area (Kevan 1972).

The first systematic surveys of the entire island, conducted in March 1971 and May 1972, estimated a total of 3800 animals (Urquhart 1973).

Systematic surveys of the south and north halves of the island in 1979-80 were combined to produce a total population estimate of 19,328 ± 5,464 for March 1980 (Vincent and Gunn 1981).*

A comparison of the 1980 estimate with that of 1972 indicates that the muskox population has been increasing over the past eight years at an average annual rate of 20-25% (Vincent and Gunn 1981).

Calf crop estimates for 1970-72 ranged between 16.3% and 31.9%, the latter figure being the highest recorded for the species (Urquhart 1973). Recruitment rates of 11.7% in 1971 (Urquhart 1973), 13.9% in 1972 (Urquhart 1973), and 13.2% in 1979 (Vincent 1979), imply a productive population but one not so prolific as the increase in total numbers suggests. Discrepancies between these indices may be due to the combined inaccuracies of recruitment and total population estimates, or to immigration from Victoria Island.

Muskoxen are currently distributed throughout Banks Island with highest concentrations in the Thomsen and Parker River drainages. Historical evidence indicates that the Thomsen River area could be a refugium for muskoxen on Banks Island, and perhaps Victoria Island as well. Inter-island movements between the two islands seem likely.

At present Banks Island supports about 35% of Canada's known muskox population.

Utilization

Recent concern over potential competition between muskoxen and caribou on Banks Island, and the realization of the large muskox population there, has led to the establishment in 1981 of a quota of 2000. To date, less than 200 animals per year have been taken from this quota, but extensive efforts have been made to market the meat commercially. The Inuvialuit Development Corporation runs a small store called "Ulu Foods" in Inuvik, which sells various cuts of packaged muskox meat. This rich protein source is being looked at for use in inter-settlement trade in areas where there is a protein shortfall.

The harvest programmes in 1981 and 1982 were outlined in a cooperative management agreement between the Inuvialuit Development Corporation, the Inuvialuit Game Council, the Sachs Harbour Hunters and Trappers Association, and the Government of the Northwest Territories. In addition to the harvest, biological data on muskoxen were gathered, and 13 calves in 1982 were captured and transported to Saskatoon to establish an experimental herd under the auspices of the Western College of Veterinary Medicine.

In addition, successful sport hunts have been conducted from Sachs Harbour since 1979, and will likely expand in the future.

Industrial Activity

The first seismic surveys were conducted on Banks Island in 1970 (Urquhart 1973). Since then many such exploration programmes and associated geological, geophysical, gravity and geochemical investigations have been undertaken there. Exploratory oil wells have been drilled at various locations on the island.

Current exploration activity is concentrated in the northeast where seismic surveys are often conducted in areas of high muskox density. Discoveries of oil and/or gas fields are expected in that region.

**In July 1982 a survey of the entire island was undertaken. Initial results indicate a population of 9,400 ± 2,100 (Latour pers. comm.).*

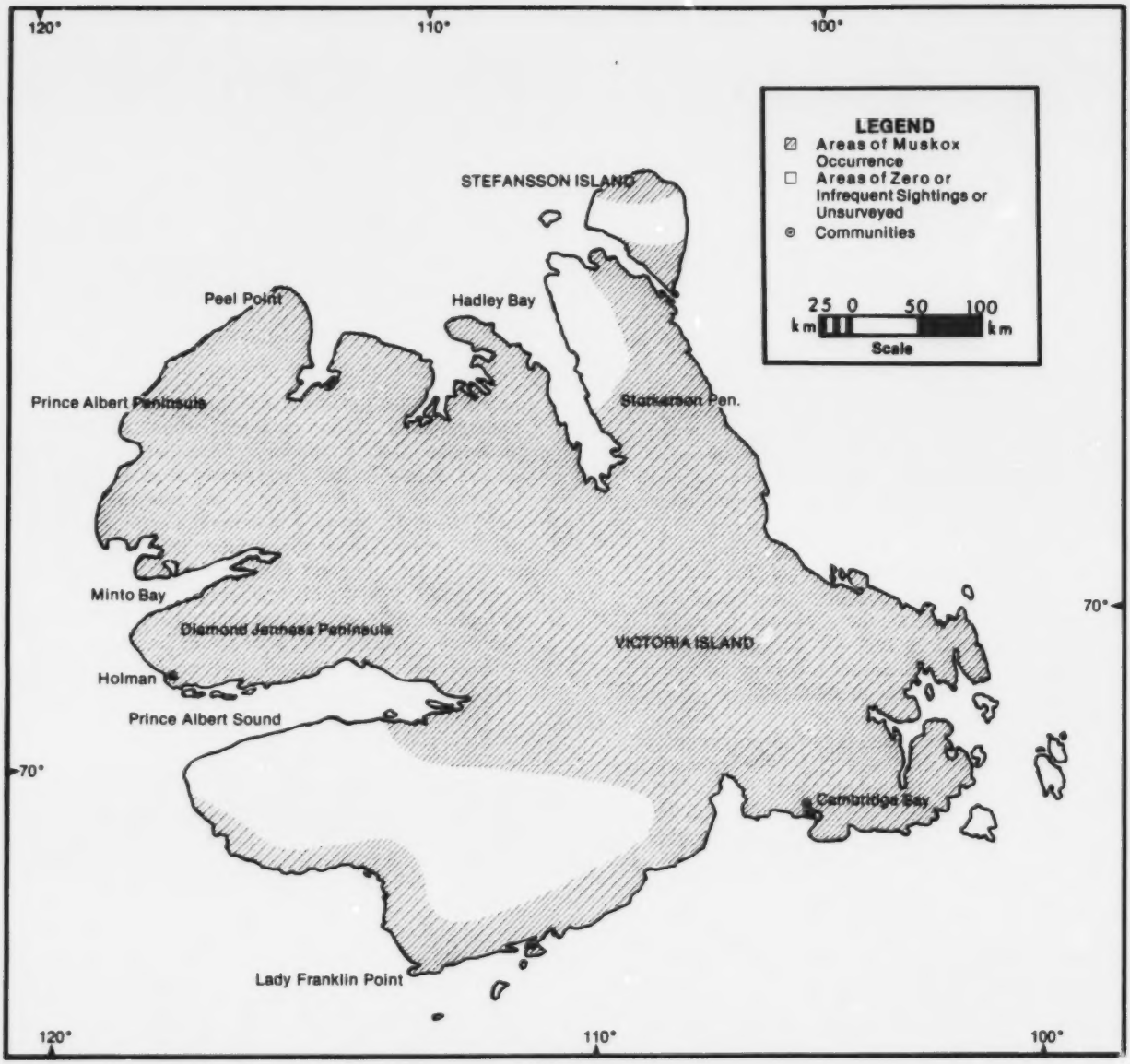


Figure 7. Zone 4, showing muskox areas on Victoria Island, based on sightings from surveys 1974-82.

ZONE 4

Victoria and Stefansson Islands are designated as a separate zone in recognition of their special status in muskox management (Fig. 7). Until 1980, this large central arctic land mass had never been subjected to a systematic wildlife survey by any management or consultant agency, nor had it ever been a site for muskox research. Consequently historical information is sparse and the importance of this area to the species has only recently been confirmed.

Victoria Island

Population Status

Muskoxen are presently found throughout most of Victoria Island, with the majority inhabiting the northwestern lobe between Hadley Bay and Prince Albert Sound. They are scarce or absent from part of Storkerson Peninsula and the southwestern part of the island (Decker pers. comm.).

Records of muskox numbers on Victoria Island for the early part of this century are vague, but suggest that the species had become quite rare. A 1930 summary of muskox distribution in Canada assigned only 20 animals to the island (Anderson 1930).

The total population of the island in 1958-59 was estimated to be 908 animals (Macpherson 1961). In 1976 a total of 183 muskoxen was counted on a reconnaissance survey of a northwestern portion of the island, and 215 were counted at the same time in an area north of Cambridge Bay; calf crop estimates from these mid-July censuses were 16.4% and 16.7%, respectively (Spencer 1976).

A comprehensive reconnaissance survey, in 1979, of Diamond Jenness Peninsula and the Minto Inlet area recorded 453 muskoxen (Boxer 1980); in the same year 525 animals were counted on a similar survey in the southeastern portion of the island (Boxer 1979).

A stratified transect survey of this island, excluding Storkerson Peninsula, produced a 1980 estimate of $12,160 \pm 2,890$ ($P < .05$) muskoxen (Jakimchuk and Carruthers 1980). From three samples totalling 421 animals, the percentages of calves in late July to mid-August were estimated to be 26.0%, 27.0% and 28.1% (Jakimchuk and Carruthers 1980).

The current status of muskoxen on Stefansson Island is unknown. Approximately 20 - 50 animals were observed along the coast in the early 1970s (S. Miller pers. comm.). It seems reasonable to assume that since that time, the island has been occupied by this species either intermittently or on a permanent basis.

Utilization

Muskoxen are hunted on a quota basis by residents of Holman, who use the meat for subsistence and the hides for sleeping robes. Some hides, with heads, are sold locally to barge crews. Part of the quota is reserved for sport hunting, and another portion of the quota is used by outpost camps at Kuuk River and Minto.

Residents of Cambridge Bay also hunt muskoxen north of their settlement on a quota basis. Hides and heads may be shipped to taxidermists or sold locally either by individual hunters or the Hunters and Trappers Association. Horns from animals used for subsistence are carved and sold in the local craft shop.

A second hunting area has been designated for this settlement in the vicinity of Hadley Bay. This quota is never used due to the remoteness and inaccessibility of the zone.

Industrial Activity

Potential for oil and gas production in this area is very low. An occasional seismic survey has been conducted in the past on the west side of the island.

Recent activity is limited to the establishment of Decca sites (navigation beacons) by the Polar Continental Shelf Project at three locations on the west coast. Geotechnical and soil investigations have been conducted by Polar Gas in support of a proposed pipeline route across western Victoria Island from Peel Point to Lady Franklin Point.

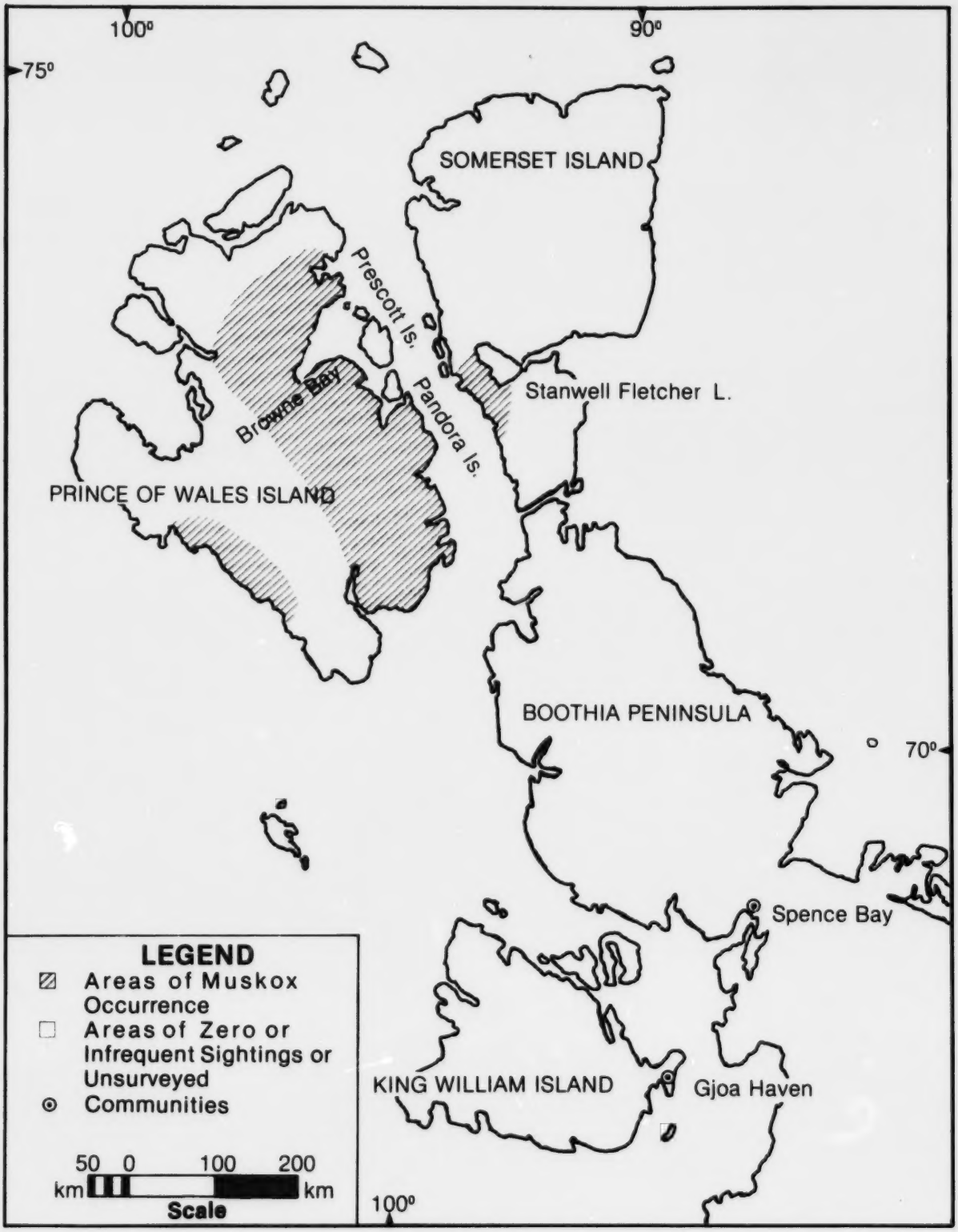


Figure 8. Zone 5, showing muskox areas on Prince of Wales and Somerset Islands, based on sightings from surveys 1974-80.

ZONE 5

The remaining arctic islands which are or have been occupied by muskoxen are combined with Boothia Peninsula in this zone, where limited hunting takes place and industrial activity might intensify in the future (Fig. 8).

Prince of Wales Island

(Including Prescott Island and Pandora Island)

Population Status

The earliest available population estimate for Prince of Wales Island is 1500 muskoxen, based on cursory observations from scientific expeditions in the late 1920s (Anderson 1930). Another biological investigation in 1958 recorded about 50 muskoxen on the island; however, the presence of numerous skulls suggested a substantial population at some time in the past (Manning and Macpherson 1961).

Four systematic surveys in 1974-75 were averaged to propose a total population of 600 (Fisher and Duncan 1976). A transect survey in 1976 with 50% coverage of the high density areas recorded a total of 286 muskoxen (Elliot 1976). Also in 1976, a study of the effects of helicopter harassment on muskoxen identified 276 animals in 65 groups; the observers felt that about 400 animals inhabited the island at that time (Miller and Gunn 1977). In 1980 a transect survey resulted in an estimate of 800-900 (Gunn and Decker 1982).

Observations from the 1974-75 surveys indicated that, in summer, muskoxen frequent coastal areas along the east side of Prince of Wales Island with the majority of animals concentrated around Browne Bay. The calf crop estimates from those surveys varied between 7% and 15% (Fisher and Duncan 1976).

A herd of 12 muskoxen was sighted on Prescott Island in July 1975, but none were seen there on three other surveys (Fisher and Duncan 1976). A herd which appeared on Somerset Island in 1975 was believed to have emigrated from Prince of Wales Island (Fisher and Duncan 1976). A yearling muskox and tracks of a second animal were sighted on the sea ice between Prince of Wales and Victoria Island in April 1973 (S. Miller pers. comm.). Inter-island movements therefore seem to occur between these two areas and probably also among Prince of Wales, Pandora, Prescott and Somerset Islands.

Utilization

Muskox harvest quotas are allotted to the settlements of Resolute and Spence Bay. The former community harvests part of its allotment (four out of six in 1980). The latter uses none, owing to the remoteness of the area.

Hides taken by Resolute hunters may be sold eventually. However, they often remain a long time in the community. Some meat is traded to Igloolik and the remainder is used for subsistence.

Industrial Activity

In the past, seismic surveys have been conducted on Prince of Wales Island, but no oil or gas deposits were discovered there. A 48-inch gas pipeline may be constructed across this island from Resolute to Boothia Peninsula.

Somerset Island

Population Status

Muskoxen may have been common on Somerset Island at one time, but no record of a substantial population has been found in recent years. None were seen on the island during scientific expeditions in the late 1920s (Anderson 1930).

An estimate of 100 animals made by Inuit hunters in 1961 indicates the presence of muskoxen in limited numbers (Tener 1963). Three surveys of the island between 1974 and 1975 failed to record any animals (Fisher and Duncan 1976). However, a herd of 12 became established in the vicinity of Stanwell-Fletcher Lake in the summer of 1975, and was sighted there again in 1976 and 1977 (Russell et al. 1978).

A transect survey in 1980 sighted a herd of 25 muskoxen near Stanwell-Fletcher Lake plus four others (Gunn and Decker 1982). This may represent an expansion of the original 1975 colony with some additional immigrants from Prince of Wales Island. Hence, the pattern may be one of intermittent occupancy in small numbers despite apparently adequate habitat. These fluctuations are probably due to movements between Prince of Wales and Somerset Islands.

Industrial Activity

Seismic surveys have been conducted on this island in the past. A gas pipeline has been proposed across the length of Somerset Island, but construction is unlikely, since an alternate route across Victoria Island is receiving more attention.

Boothia Peninsula

Population Status

Muskoxen may have inhabited the Wrottesley valley region at one time, but Inuit traditionally hunted them on Prince of Wales Island, and farther south on the mainland between Pelly and Wager Bay (Anderson 1930).

Four aerial surveys of the peninsula in 1974-75 failed to record any animals (Fisher and Duncan 1976). It is unlikely that this species is present there in anything but very limited numbers now.

King William Island

Population Status

A soup ladle fashioned from a muskox horn was found on King William Island in 1945 (Harington 1976). Muskoxen are believed to have been extinct on this island for some time (Tener 1965).

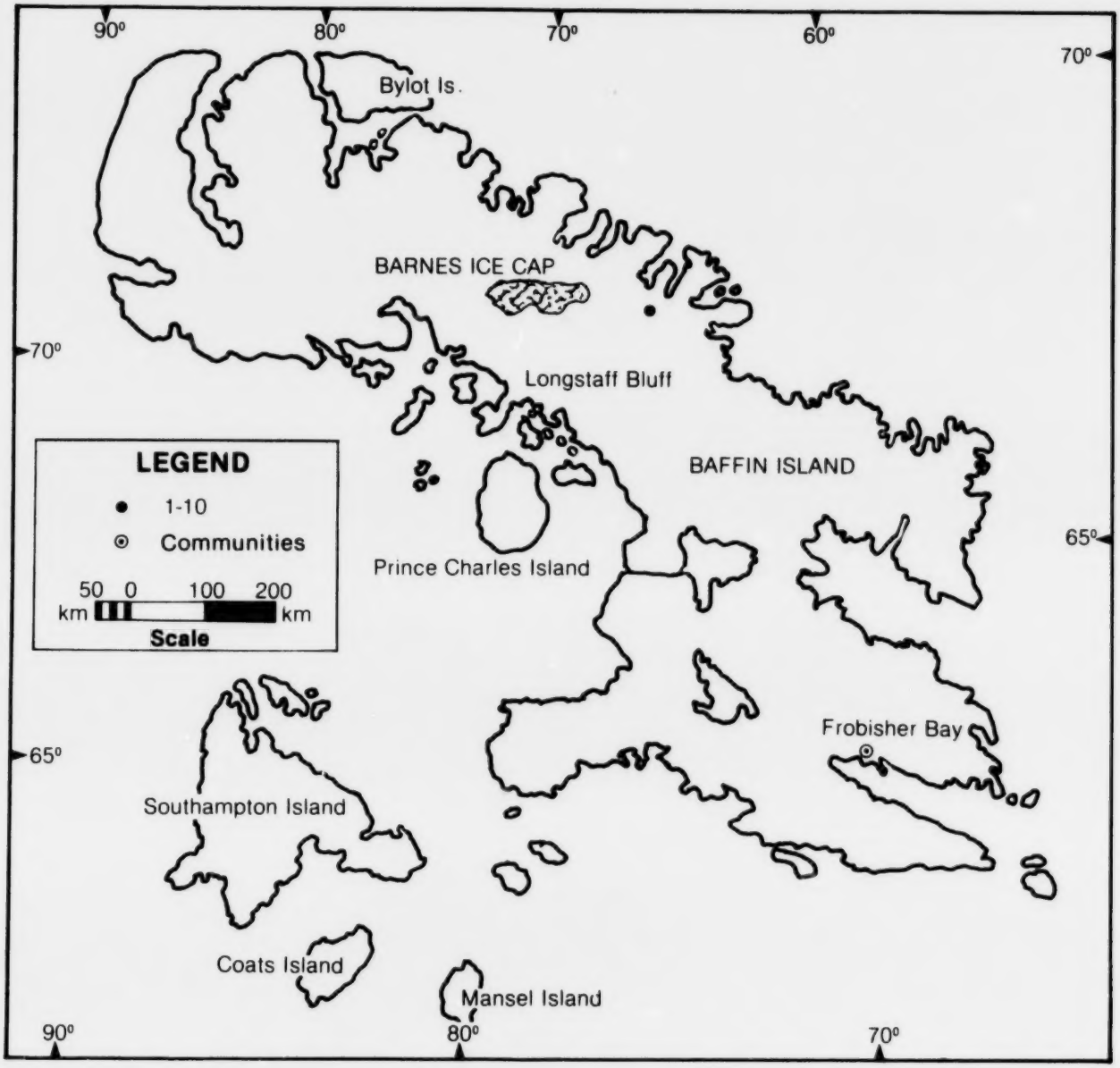


Figure 9. Zone 6, showing a single muskox sighting on Baffin Island in 1968.

ZONE 6

The eastern arctic islands, comprising Baffin Island, its satellites and the islands of Hudson Bay, constitute a large tundra region which has seldom been occupied by muskoxen (Fig. 9). Despite the proximity of mainland and insular populations, and the frequency of sea ice crossings elsewhere by this species, there is little historical and no paleontological evidence of occupation for these islands.

Baffin Island Group

(Including Bylot Island and Prince Charles Island)

Population Status

A muskox hornsheath fragment collected in 1974 near Longstaff Bluff, Baffin Island, was believed to be an artifact transported from the mainland (Harington 1976). No other remains have been discovered on the island. Early accounts of resident Inuit recognizing drawings of the animal made by explorers were not considered proof that muskoxen inhabited the area (Harington 1976).

Until recently, it was generally believed that muskoxen had never occupied Baffin Island, and that they were prevented from doing so by snow conditions which limited accessibility of winter forage (Harington 1976). However, in 1980 a report was made of eight animals sighted in 1968 southeast of Barnes Ice Cap, 69° 25' N, 70° 38' W (Ferguson pers. comm.).

Muskoxen have never been reported on Bylot or Prince Charles Islands.

Southampton Island Group

(Including Coats Island and Mansel Island)

Population Status

Reports from the early 1930s record discoveries by Inuit of a few muskox bones on the island and a carcass on the floe ice (Harington 1976). Live animals have never been observed there, and it has been concluded that the existing remains represented immigrants who failed to survive on the island (Harington 1976). There are no records of muskoxen on Coats or Mansel Islands. A systematic survey of caribou on Southampton Island in 1978 did not record any muskoxen (Kraft 1978).

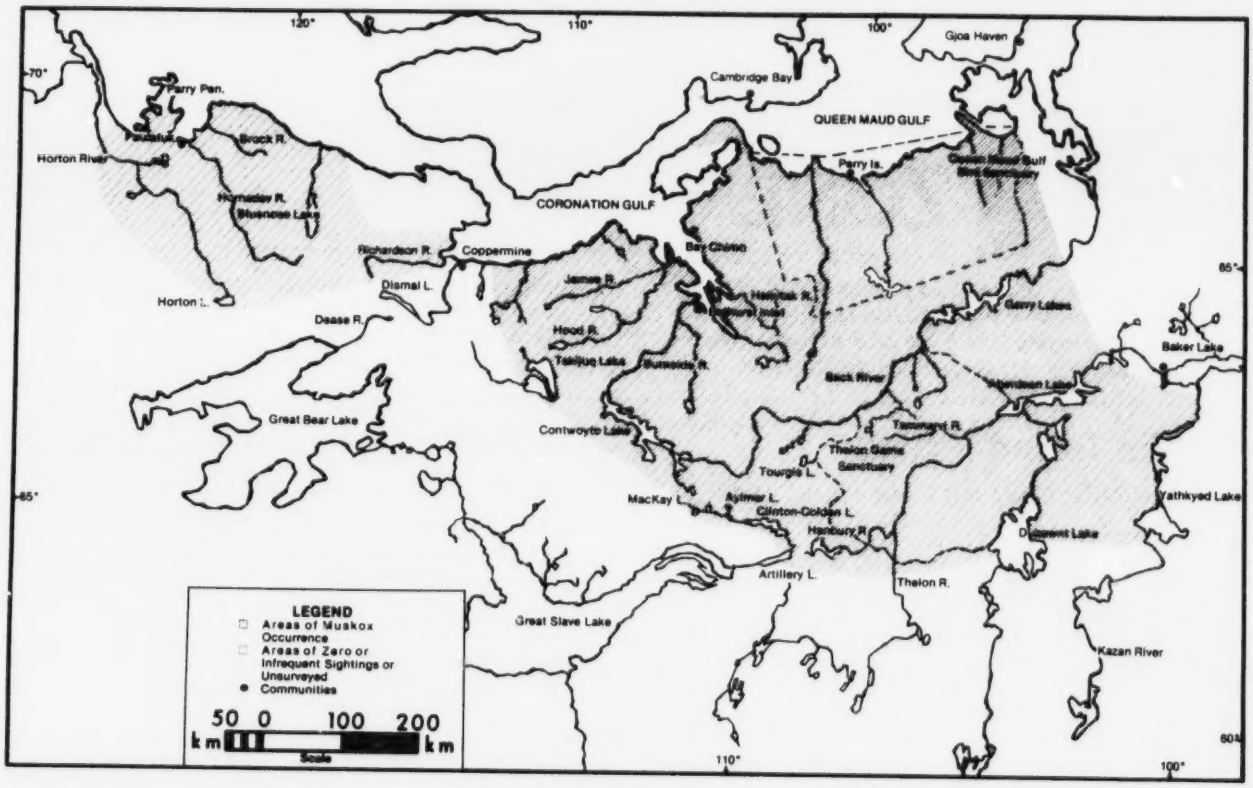


Figure 10. Zone 7, showing muskox areas on the mainland, based on sightings from surveys 1974-80.

ZONE 7

All mainland regions of high to moderate muskox densities are included in this zone (Fig. 10). The general pattern of distribution within the zone is of relatively high density areas grading into those of moderate density, with very low or nil densities on the periphery. Each high density area is treated as an individual group. The remaining regions are described separately, although it is presumed that movements may occur among them.

Queen Maud Gulf

Population Status

A relatively large number of muskoxen are presently distributed along the valleys of rivers draining into the Queen Maud Gulf (Decker pers. comm.). The boundaries of this high density area coincide approximately with the borders of the Queen Maud Gulf Bird Sanctuary. To the east muskox numbers decrease sharply, while to the south and west densities are low, but interspersed with occasional moderate concentrations such as those south of Garry Lakes and along the upper Back River (Decker pers. comm.).

Historical records suggest that muskoxen were never abundant in this area even prior to the 'decimation period' (1864-1916), perhaps due to continuous hunting pressure from resident Inuit (Decker pers. comm.). The muskox population no doubt declined to virtual extinction during the succeeding interval of trade-induced slaughter, and seems to have been recovering slowly until recent times (Tener 1963).

No muskoxen were sighted on a goose-nesting reconnaissance survey of the Queen Maud Gulf area in 1958 (Barry pers. comm.). Only two animals were recorded on a similar but very intensive survey of the entire area in 1961 (Barry pers. comm.). A total population of 3000 muskoxen was approximated from observations during a goose-nesting survey in 1978 (Barry pers. comm.). In 1982, 2026 animals were counted, from which a total population of 6000+ muskoxen has been inferred (Gunn pers. comm.). A calf crop of 15% for 1982 from aerial observations may be a substantial underestimate (Gunn pers. comm.).

It has been suggested that this area was colonized by animals from the Thelon Game Sanctuary in the early 1960s, and since then the population has continued to expand rapidly (Decker pers. comm.). Expectations are that emigrants from this area may establish new populations further east in presently unoccupied territory (Decker pers. comm.).

Utilization

Muskoxen are harvested from this area by residents of five communities and one outpost camp.

Cambridge Bay (including Bathurst Inlet and Bay Chimo) Some heads and hides are exported to taxidermists in the south either by the Hunters and Trappers Association or by individual hunters. Other hides and heads are sold locally. Horns may be carved and sold to the local craft shop. Meat is used locally for subsistence.

Gjoa Haven Muskoxen are used entirely for subsistence. Some hides function as sleeping robes.

Baker Lake Residents hunt muskoxen in a zone which spans regions of moderate and low densities, including a corner of the Queen Maud Gulf subpopulation. The animals are used primarily for subsistence. Heads may be displayed as "trophies" on the hunters' houses. Hides are seldom sold and then at low prices. Some deteriorate due to inadequate preparation and storage methods.

Perry Island Muskox hides and heads are brought from this outpost camp to the Cambridge Bay Hunters and Trappers Association for sale. The meat is used for subsistence by outpost camp residents.

Industrial Activity

Few mineral exploration programmes have been undertaken within the Queen Maud Gulf Bird Sanctuary because of restrictive regulations.

Thelon Game Sanctuary

The Thelon Game Sanctuary was proclaimed by federal Order in Council on July 15, 1927. Responsibility for the sanctuary through control of Game Management was transferred to the Territorial Government in 1949, with boundary changes being made in 1956 and again in 1972 (Donihee 1979). The mandate of the N.W.T. Wildlife Service continues to be the control of human activities in the sanctuary as they relate to wildlife.

Population Status

The Thelon Game Sanctuary was established primarily to preserve a small number of muskoxen believed to be one of the last remnants of the mainland population (Tener 1965). The majority of animals has always been distributed along the banks of the Thelon River and its tributaries, particularly the Tammarvi and Hanbury rivers (Decker pers. comm.). Muskoxen are also relatively abundant in the northeastern quarter of the sanctuary. Elsewhere herds have been reported but whether they are transients or residents is unknown (Decker pers. comm.).

Animals appear to move freely along the river valleys, and presumably venture inland to lake margins and seepage meadows where forage is available. Winter and summer ranges are often contiguous, and differ mainly because higher windswept ground is preferred when snow depths become excessive at lower elevations.

A survey of the Sanctuary shortly after its creation resulted in an estimate of 250 muskoxen for the total area (Anderson 1930). In 1936 only 174 animals were observed, and a total population of 300 was estimated in 1937 (Clarke 1940). In 1956 half of the sanctuary was surveyed and 192 muskoxen were counted (Tener 1956). A second survey of the entire sanctuary in 1966 produced a total count of 568 and a conservative estimate of 600 animals (Tener and Kuyt 1966). Although no comprehensive survey has been done since then, it is generally assumed that the present population is near the 1966 level.

Utilization

A total ban on hunting muskoxen in the area has been maintained as a condition of the Sanctuary since 1927.

Industrial Activity

All forms of exploration by private commercial enterprises are prohibited in the Sanctuary. Government projects such as geological and wildlife studies have been undertaken at times with permission of the N.W.T. Wildlife Service (Donihee 1979).

Thelon East

(Between Yathkyed, Dubawnt, Aberdeen and Baker Lakes)

Population Status

Approximately 200-300 muskoxen are believed to inhabit this area. This estimate is based on sightings from the 1978-79 Caribou Monitoring Program, geologists' reports and a 1979 reconnaissance survey (Decker pers. comm.).

Historical records suggest that this area was previously occupied by a larger population than presently exists there, and that numbers may have been reduced to extinction during the trading period (Tener 1965). The reappearance of this species has been attributed to range expansion from the Thelon Game Sanctuary population (Decker pers. comm.).

Utilization

Muskoxen are hunted in this area by residents of Baker Lake (see Queen Maud Gulf).

Industrial Activity

Mineral exploration programs have recently been concentrated in this area, resulting in a relatively high level of activity, principally in the form of aircraft support of diamond drill camps, plus geological, geophysical and geochemical surveys.

Central Mainland

Population Status

The territorial mainland above the treeline and between the 106th and 117th longitudes supports a low density population for which the current distribution is poorly defined.

In 1936 muskoxen were reported in the vicinity of the following lakes: Clinton-Colden, Aylmer, Tourgis, Muskox, MacKay, and Providence (Clarke 1940). Also during the 1930s, they were reported to be numerous between Contwoyto Lake and Burnside River (Clarke 1940).

The number of muskoxen west of Bathurst Inlet was estimated to be 450 in 1958 and 150 in 1970 (Searing and Alliston 1979). In 1967, a total of 98 muskoxen was observed during caribou surveys of the Bathurst Inlet area (Thomas 1967). In 1969, a total of 136 muskoxen in 17 herds was observed between the upper Back River and the Burnside River (Ruttan 1969).

A survey of the Bathurst Inlet area in 1976 recorded 110 muskoxen (Spencer 1976). Another muskox survey in 1979 counted a total of 80 muskoxen west and south of Bathurst Inlet (Boxer 1980). Two herds of muskoxen totalling 63 animals

were seen near the Haikitak River in 1979 (Searing and Alliston 1979).

The area between Tourgis Lake and Artillery Lake is also believed to be an important muskox range (Searing and Alliston 1979). Observations by persons familiar with the Bathurst Inlet area cite the James and Hood Rivers, Contwoyto Lake, Takijuq Lake and the upper Back River as being usually occupied by muskoxen in recent years (Covello pers. comm., McKillup pers. comm.).

From numerous flights covering most of the central tundra region, a DIAND Resources Management Officer proposed a current total population of 1000-1500 muskoxen (McKillup pers. comm.). Calves comprised 7.4% of 136 muskoxen segregated between mid-June and mid-August in 1969 (Ruttan 1969). Of 110 muskoxen segregated in mid-July 1976, 17.2% were calves (Spencer 1976).

Utilization

Muskoxen are hunted on a quota basis by residents of Bathurst Inlet and Bay Chimo. Depending upon available means, hides and heads may be sent to the Cambridge Bay Hunters and Trappers Association which handles their sale. Otherwise the hides may be used for sleeping robes and the horns carved for eventual sale. Meat is used for subsistence.

Industrial Activity

Many mineral exploration programs are conducted each year in this area, and a producing mine is located at Contwoyto Lake.

Great Bear North

Population Status

Muskoxen inhabit a broad region north of Great Bear Lake to the arctic coast, bounded on the west approximately by the treeline and extending eastward to the upper Richardson River (Kelsall et al. 1971, Hawley 1978, Spencer 1980). Within this area there appear to be concentrations in the vicinities of:

a) the Brock River drainage and lower Hornaday River,

b) Bluenose Lake east to the upper Richardson River,

c) tributaries of the upper Horton River north of Horton Lake, and

d) tributaries of the Horton River from Delesse, Granet and Stefansson Lakes (Hawley 1978, Boxer 1980, Spencer 1980).

Elsewhere, herds are scattered with no apparent overall pattern. They seem to be absent from the Dease River - Dismal Lakes area where they were once plentiful (Kelsall et al. 1971, Spencer 1980). Winter and summer ranges have not been identified, although it may be supposed that animals move from river valleys and low-lying meadows to relatively snow-free uplands, as they do elsewhere on the mainland.

Muskoxen were abundant in parts of this region until their numbers were decimated by the hide trade (Tener 1963). A herd of 10 was reported near Bluenose Lake in 1949, and 86 animals were observed near the headwaters of the Horton River in 1953 (Kelsall et al. 1971). By 1965 it was believed that about 100 animals were in the Bluenose Lake area and 200 south of Paulatuk (Kelsall et al. 1971).

An assessment of the population for 1971 from a variety of sources was 425-600 (Kelsall et al. 1971). From observations during caribou surveys in 1974 and 1976, the estimate was about 2000 (Hawley 1978). A population of 4502 ± 1675 ($P < .05$) was calculated from transect surveys in 1980 of four strata covering a large portion of the region (Spencer 1980).

Calf counts and recruitment figures are not available from any data, although "good" calf crops and yearling recruitments are reported for 1953 and 1967. In view of the increase in numbers and continuing range expansion, it may be assumed that average calf production and survival rates have been high in the past two decades.

Utilization

Muskoxen are hunted by residents of Paulatuk and Coppermine by quota.

Half of the Paulatuk quota is reserved for sport hunting. Hides and heads from the remaining animals are sold locally to visitors. Some horns are carved and sold locally as well. Most of the meat is used for subsistence, but some may be sold in Inuvik. An increase in the importance of sport hunting is anticipated for this settlement.

The Coppermine quota is usually filled. Animals harvested there are used for subsistence.

Industrial Activity

This area has received a minimum of attention from commercial enterprises. Parry Peninsula has been the only location of occasional exploration surveys for oil and gas deposits.

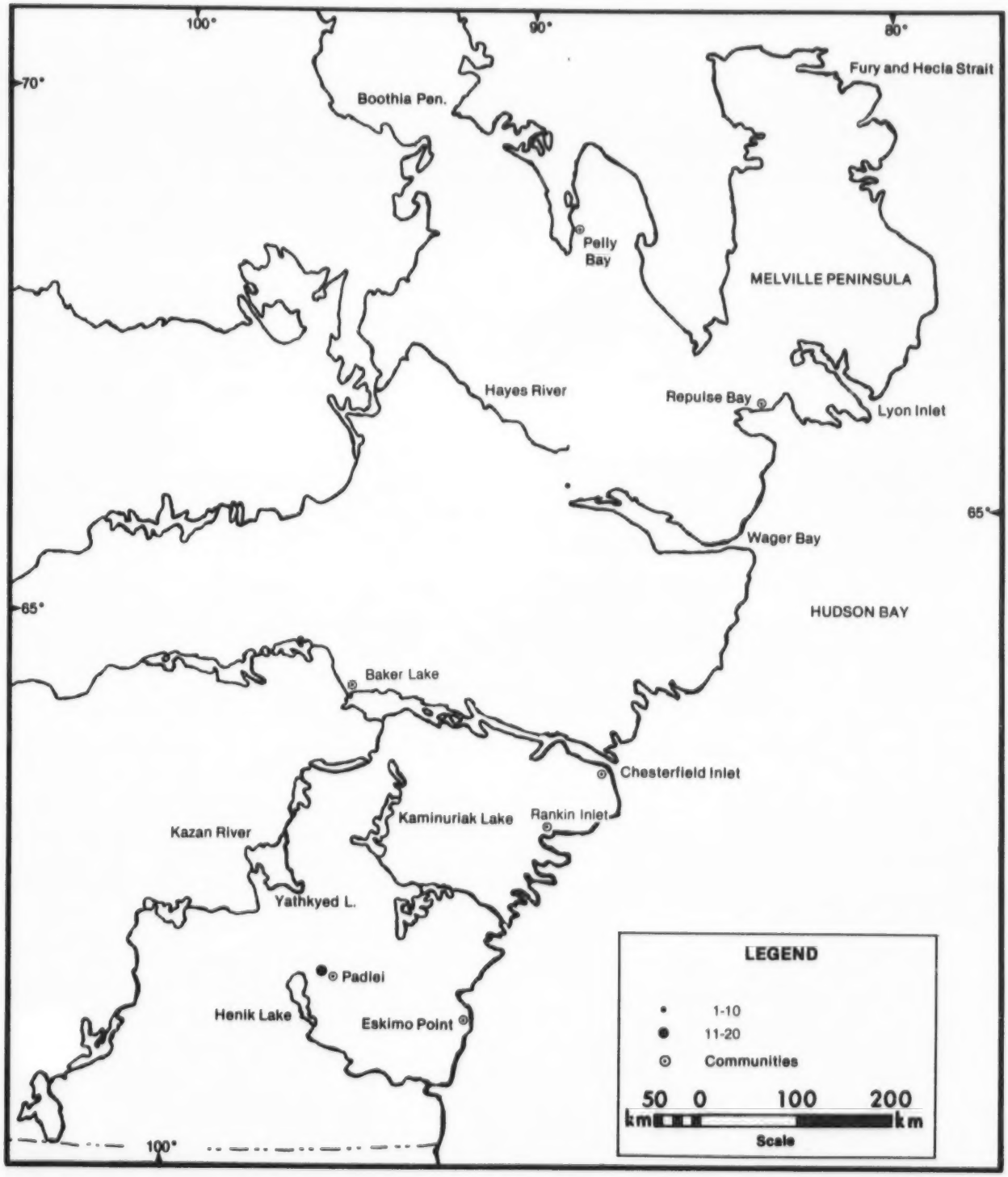


Figure 11. Zone 8, showing two muskox sightings in the Keewatin in 1976 and 1977.

ZONE 8

An extensive mainland tundra region extending westward from the Hudson Bay coast, forms a zone which at one time supported a substantial number of muskoxen, but is almost vacant now (Fig. 11).

Chesterfield Inlet North

(Excluding Melville Peninsula)

Population Status

In 1824 muskoxen were reported to be numerous south of Repulse Bay and traditionally hunted between Wager Bay and Pelly Bay (Russell et al. 1978). Between 1862 and 1916 more than 3300 hides were traded at Chesterfield Inlet (Gates 1979).

One muskox was sighted northwest of Wager Bay during a caribou calving ground survey in 1977 (Donaldson pers. comm.). Other calving ground surveys in this area and south to Chesterfield Inlet in 1976 (Heard pers. comm.) and 1980 (Gates 1981) did not sight any muskoxen.

A reconnaissance survey of the Pelly Bay area in 1980 employing local observers and investigating reputed muskox locations could not find a single animal (Gates pers. comm.). Interviews with Pelly Bay residents ascertained that muskoxen had not been seen in the area for 30 years (Gates pers. comm.).

Melville Peninsula

Population Status

It is likely that no more than a few muskoxen ever inhabited Melville Peninsula. Horns and skull parts were found in 1933 at Lyon Inlet and south of Fury and Hecla Strait at Inuit sites judged to be about 200 years old (Harington 1976). Reports from the early 1800s state that traditional Inuit knowledge of muskox distribution excluded that area. Both exploration parties and whaling expeditions in the same era held similar opinions (Harington 1976).

It seems possible, therefore, that the small number of muskoxen which once constituted the peninsular population had become extinct before 1800 (Harington 1976). No muskoxen were observed in that area during caribou surveys in 1976 and 1978 (Heard pers. comm.). A reconnaissance survey of drainage systems on the peninsula in 1980 failed to record any animals, and it has been concluded that the species does not exist there now (Gates pers. comm.).

Chesterfield Inlet South

Population Status

The historic distribution of muskoxen between Chesterfield Inlet and the Territorial border is not well documented. Between the Seal and Kazan Rivers three muskoxen were shot in 1779 and "many" were sighted near Yathkyed Lake (Hearne 1795). By 1830, distribution along the Hudson Bay coast was believed to extend occasionally as far south as the 61st parallel (Burch 1974).

Muskoxen were not observed during caribou calving ground surveys in the vicinity of Kaminuriak Lake in 1977 and 1980 (Heard pers. comm.). A herd of 12 animals was sighted near Padlei in 1976 (Decker pers. comm.). Older residents of Eskimo Point recall seeing muskoxen north of Henik Lake (Gates 1979). In recent times much of the south Keewatin has been covered by various reconnaissance surveys and numerous mining exploration flights, but reports of other muskox sightings have not been received.

Industrial Activity

Many mineral exploration programmes take place annually in the southern half of this zone. Producing mines may eventually be located there, and a proposed pipeline route crosses the region from north to south.

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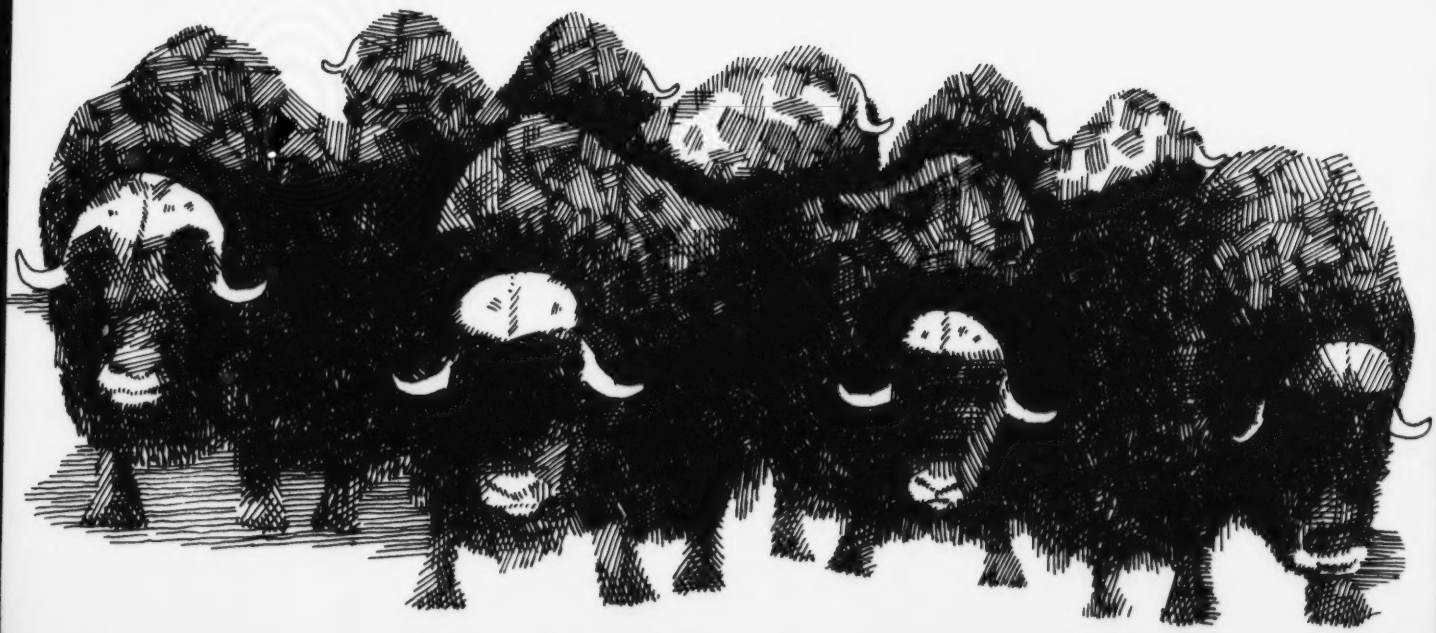

POOR

QUALITY

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